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Future of the wine sector

BY Dr. Richard Smart

Read this if you are under 30.

Here you are; you have finished school and are now gathering those important first years of experience in the wine sector. Do you ever wonder what the future may hold for you? Is your selected area of wine industry involvement the most appropriate one for the future?

If you are 30, and presuming that you work till 65, you will finish your career in 2041. Imagine if you are planting a vineyard now, it will be 35 years old in 2041, relatively old by today's standards. Will your choice of site and variety still be relevant then? If you are establishing a winery and a reputation, will these still be secure in the medium-term?

I recently attended two conferences which caused me to ponder the medium and long-term future of the wine sector.

The two conferences were the "Terroir" conference at the University of California-Davis and "Global Warming and Wine" hosted by the Wine Academy in Barcelona, Spain. Both conferences gave their audiences reason to reflect on the future.

Climatic effects at UC Davis

The "Terroir" conference was opened by Alain Carbonneau (University of Montpellier, France). He spoke of the extensive French studies on terroir, and how these have identified the impacts of soil variability and climate effects. A large study on Syrah showed the significance of seasonal variation in climate and soil effects. Studies in Chile have shown the effect of evening temperatures. The studies described by Carbonneau are typical of many reported from Europe, where field studies have attempted to understand the components of terroir.

The conference heard several compelling arguments. For example, Professor Warren Moran (University of Auckland, New Zealand) contended that "terroir" is a man-made construction, so the human element is an essential component of terroir.

Another argument, enunciated by several persons including myself, is that terroir effects can and should be considered as a question of scale. At the macro-scale of tens of miles, there are climate effects, that, for example, determine the suitability of a region for specific varieties. The meso-scale, of a few miles down to hundreds of yards, allows for topographic effects like slope and aspect. The micro-scale of a few yards to tens of yards typically shows soil effects.

Terroir, climate, and wine varieties

Our experience with viticulture over two millennia tells us that certain regions (the macro-scale) are best suited to certain varieties. As very broad examples, Pinot Noir is best suited to cool climates, Cabernet Sauvignon to moderate climates, and Syrah to hotter climates.

As a result, we see that certain regions have reputations for wine quality. At the international scale, these are very well-known, for example, Bordeaux for Cabernet Sauvignon, Burgundy for Pinot Noir, and Alsace for Riesling. My analysis investigated the extent to which the New World is developing similar trends, where certain regions are developing reputations for wine quality of specific varieties.

I performed this analysis for Australia and for California. In Australia, I used two methods. One was to survey wine journalists for their opinion whether certain regions are developing a reputation for wines made from selected varieties. The second was to analyze wine show results. Both procedures gave similar results.

The results showed that certain varieties performed well in a relatively limited range of climates, as measured by temperature conditions. However, not all places with similar temperatures appeared to achieve the same reputation; neither were there necessarily a limited range of temperatures over which a particular variety performed best. But, as we expect, it was only cool places that developed a reputation for Pinot Noir and hot places with a reputation for Syrah.

In California, I compared published grape prices with mean July temperature, which is well correlated with heat degree days. I recognize that grape prices can reflect supply and demand and indicate intrinsic value for wine. The results were less clear than those for Australia, and they appeared to indicate that Napa Valley origin was an important consideration, as well as variety suitability to temperatures.

Global warming and wine

If, as the "Terroir" conference illustrated, climate and temperature are critical factors in wine quality, what then will be the impact of predicted climate change? Depending on which climate change model one accepts, temperatures are predicted to rise about 2°C (3.6°F) in the next 50 years. The implications for viticulture of such changes were very well explained by Hans Schultz (Geisenheim, Germany) and Greg Jones (Southern Oregon University) at the conference in Davis.

Both men predicted shorter frost periods and that phenological stages will be advanced, including harvest. This means that ripening and harvest will take place under warmer conditions than in the past. In other words, a variety suited to a certain region now may well not be suited to that region in 50 years' time.

Using Mean July Temperature, and an increase of 2.0°C one can see that

Santa Maria (now at 17.3°C) will become like Napa Valley (19.3°C), St. Helena at 21.7°C will become like Stockton at 23.5°C, Healdsburg (22.4°C) will approach Modesto (24.4°C), Modesto will be like Madera (26.3°C), and Fresno at 27.8°C will be hotter than Bakersfield (28.8°C) is today. Just think about the implications of these changes for the wine industry.

Global warming at Barcelona

There were only 200 attendees at Barcelona, and the heavyweight political European organizations like OIV were not present. Dr. Bernard Seguin, (climatologist from France), clearly showed how the global climate is already changing. It is fair to say that attendees were "gob-smacked." Most had no idea that global warming has already started, and what the implications for wine will be.

In fact, the problem will be worse for the northern hemisphere, and, in Europe, it will be worse for Spain and Portugal. There were discussions about the observed weakening of the Gulf Stream, which has protected western Europe from freezing winter temperatures in the past.

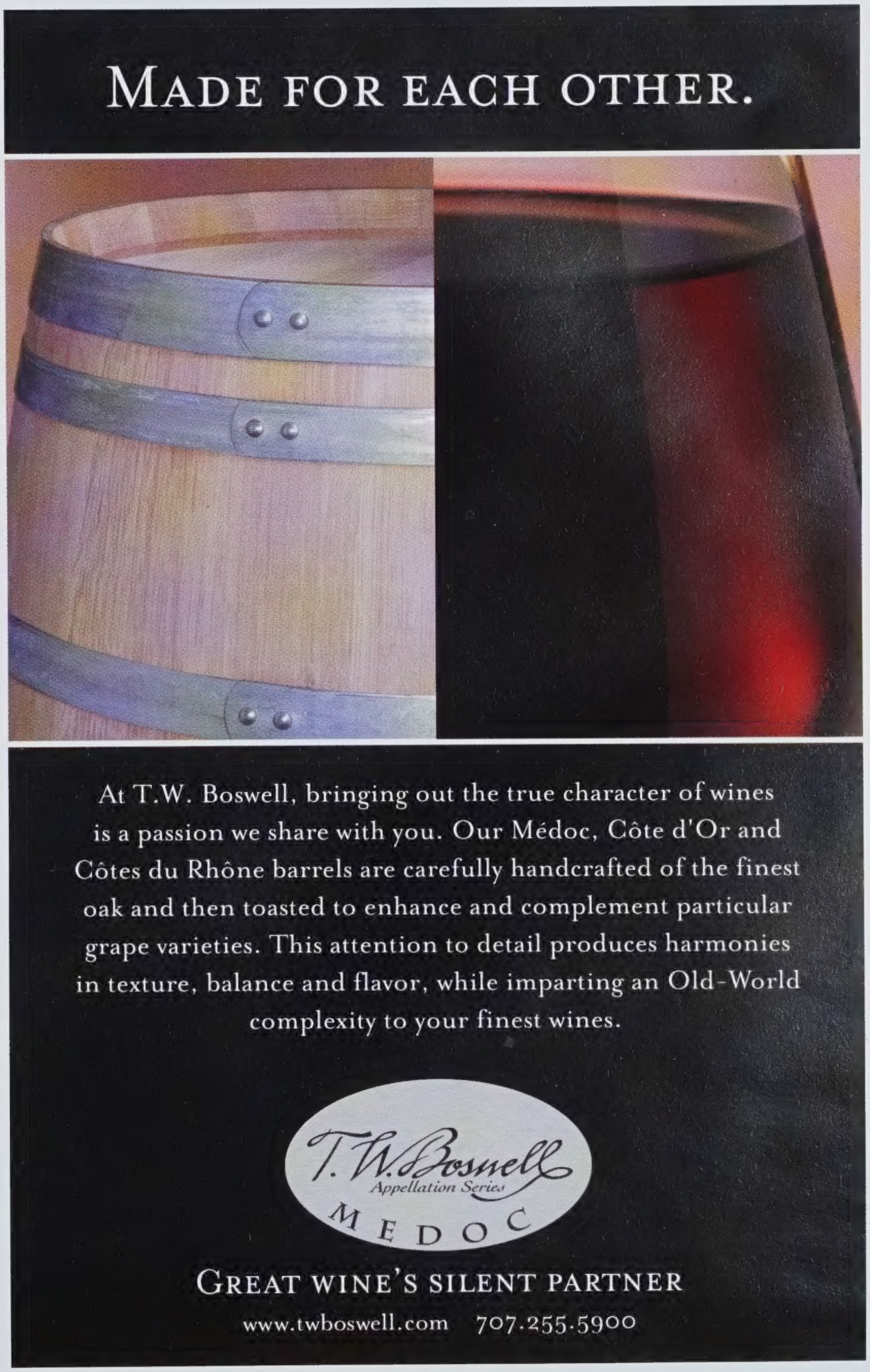
All in all, the implications are serious and worthy of further study and consideration. Attendees considered that the implications of global warming for the world wine industry are serious at all levels, from local to national to trade. Details of papers from the conference are available at www.thewineacademy.com/web/esp/ponencias.php.

Conclusion

Are you 30-year-olds still reading? Do you see my drift about how your future in the wine industry might be different than you expect? Maybe a few wine industry investors might be getting nervous also?

The issues of global warming and climate change are highly politicized. The U.S. and Australia are widely regarded as "renegade" nations for not signing the Kyoto treaty. Some governments are more pro-active than others. I have seen virtually no evidence of grape and wine political organizations being aware of the issue, even though the implications are so profound. For my part, I am writing to the most important Australian wine organizations to advise them of my concern.

For your part, American readers, what will you do? It seems bizarre to me that Dr. Greg Jones of Southern Oregon University is an authority on this subject, yet he has not been widely heard on this issue in the U.S. I would hope that Greg and others may be featured speakers at some industry-wide conference in the near future. ■



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Smaller loads reduce risk of back injuries during wine grape harvest

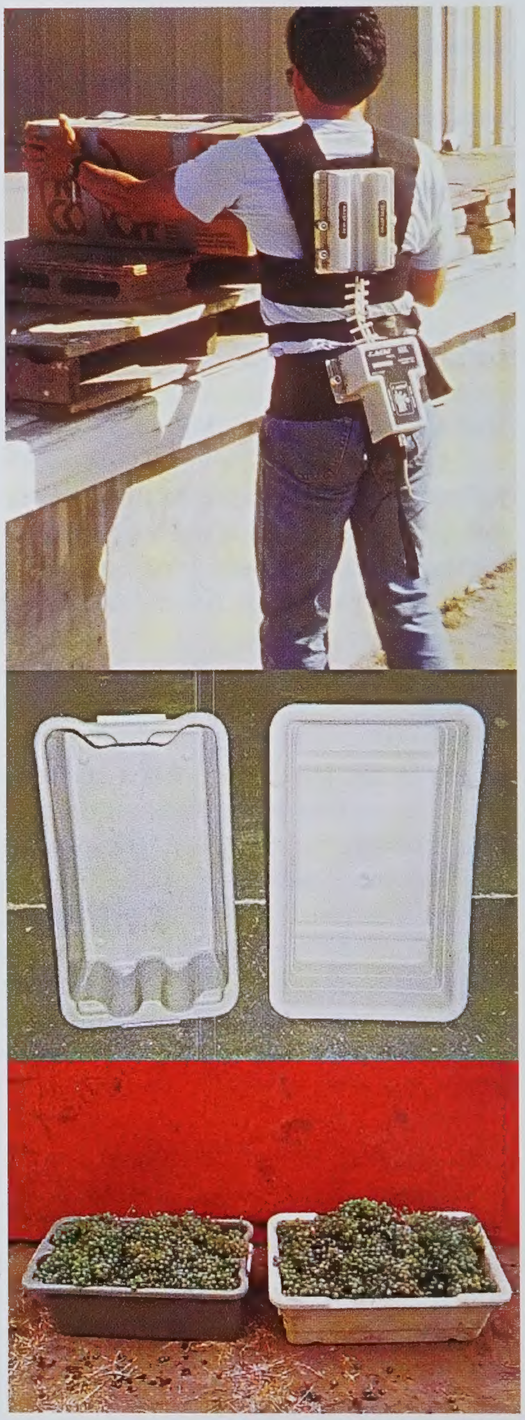
BY James M. Meyers, John A. Miles, Julia Faucett, Fadi Fathallah, Ira Janowitz, Rhonda Smith, Ed Weber

Hand-harvest work in wine grape vineyards is physically demanding and exposes workers to a variety of ergonomics risk factors. Analysis of these exposures together with data on reported work-related injuries points to the risk of back injury as a prevention priority, in particular the lifting and carrying of tubs of cut grapes (weighing up to 80 pounds) during harvest. This study evaluated the effectiveness of an intervention — the use of a smaller picking tub — on the incidence of musculoskeletal symptoms among workers during two harvest seasons. Reducing the weight of the picking tub by about 20% to under 50 pounds resulted in a five-fold reduction in workers' post-season musculoskeletal symptom scores, without significant reductions in productivity.

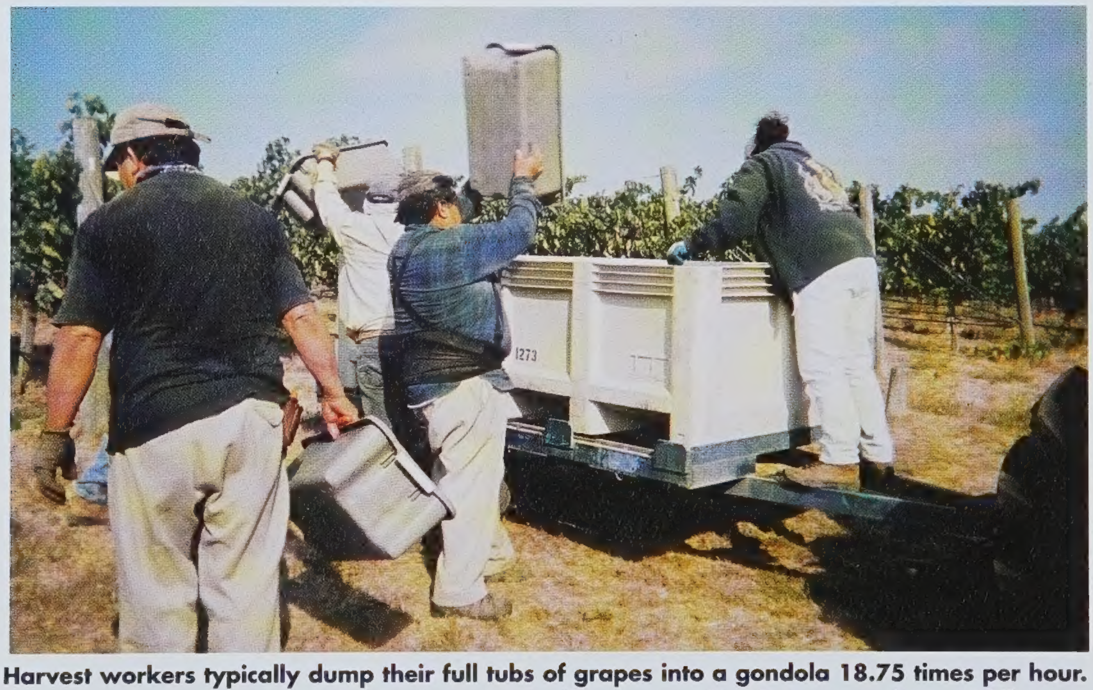
Back injuries are the most common and costly of work-related injuries in agriculture. This is also true of other industries. Overall, back injuries are the most frequently cited cause of disability in persons aged 45 or younger, and they account for the most lost time from work and a significant proportion of workers' compensation costs.[2,3,8,9,20]

Total costs for a first-time back injury can reach $10,000, with costs for repeated back injuries reaching as much as $300,000.[15,16] With an average of 3,350 back injuries reported each year in California agriculture,[1] a conservative annual cost estimate for back injuries is more than $30 million.

The causes of occupational back injury are well understood. Literature reviews indicate that heavy physical work, repeated lifting and twisting are consistently associated with greater risk. Generally, those with the heaviest labor duties have the largest numbers of injuries (including to the lower back), and lifting causes more than half of back injuries reported.



Top, **the authors fitted workers with an exoskeleton called a Lumbar Motion Monitor to study their movements during a simulated hand-harvest of grapes. *Middle,* the intervention tub (left) and standard tub (right). Note smooth bottom and added handles on the intervention tub. *Bottom,* the intervention tub holds an average of 11 pounds less grapes than the standard tub.**



Harvest workers typically dump their full tubs of grapes into a gondola 18.75 times per hour. A smaller intervention tub is lighter but must be lifted about 21.68 times per hour. While workers in this study delivered about 168 pounds less grapes per 8-hour shift with the smaller tub, neither they nor their bosses perceived a productivity decline because the reduction was small (only 2.5%).

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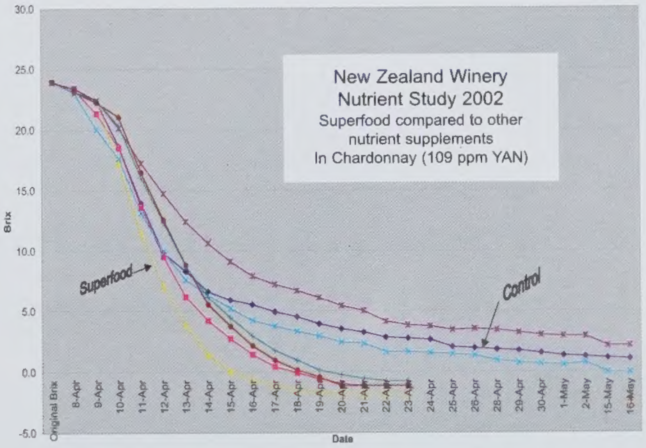

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TABLE I. Frequency of reported musculoskeletal symptoms among vineyard workers in Napa and Sonoma counties (n = 116)

	1997		1998	
Symptom	Preharvest	Postharvest	Preharvest	Postharvest
	% (n)			
Musculoskeletal	18 (21)	70 (81)	22 (26)	33 (38)
Aching	13 (15)	68 (79)	19 (22)	32 (37)
Body location				
Hand	1 (1)	0 (0)	2 (2)	2 (2)
Forearm	1 (1)	3 (3)	2 (2)	3 (3)
Elbow/upper arm	2 (2)	4 (5)	1 (1)	4 (5)
Neck/shoulders	6 (7)	16 (18)	5 (6)	11 (13)
Back	7 (8)	46 (53)	13 (15)	23 (27)
Knee	2 (2)	21 (24)	5 (6)	10 (12)
Feet	2 (2)	5 (6)	1 (1)	4 (5)

W.S. Marras *et al.* developed a dynamic methodology for identifying specific factors associated with known job tasks, using a spinal movement feedback monitor (Lumbar Motion Monitor).[12,13] Marras identified five risk factors involved in manual lifting that predicted increased risk of injury in both medium- and high-risk jobs: lifting frequency, load moment (weight of the object times its distance from the lower back), trunk lateral velocity, trunk twisting velocity, and sagittal (or forward-bending) angle.

More problematic is the issue of preventing workplace back injuries. Despite the considerable research in this area, T.B. Leamon notes that there is a paucity of research on the practical application of major theoretical models of causation to risk reduction.[10] Most prevention continues to emphasize worker training.

However, interventions aimed at reducing injury through changing worker behavior have generally failed to show any statistically significant effect on the incidence of back injuries. Contrary to general belief and industry practice, training is regarded by safety professionals as the least effective way to reduce injuries. By contrast, interventions featuring engineering controls to eliminate or reduce hazards themselves have been shown to be effective.[5]

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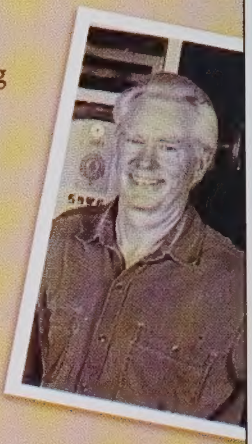

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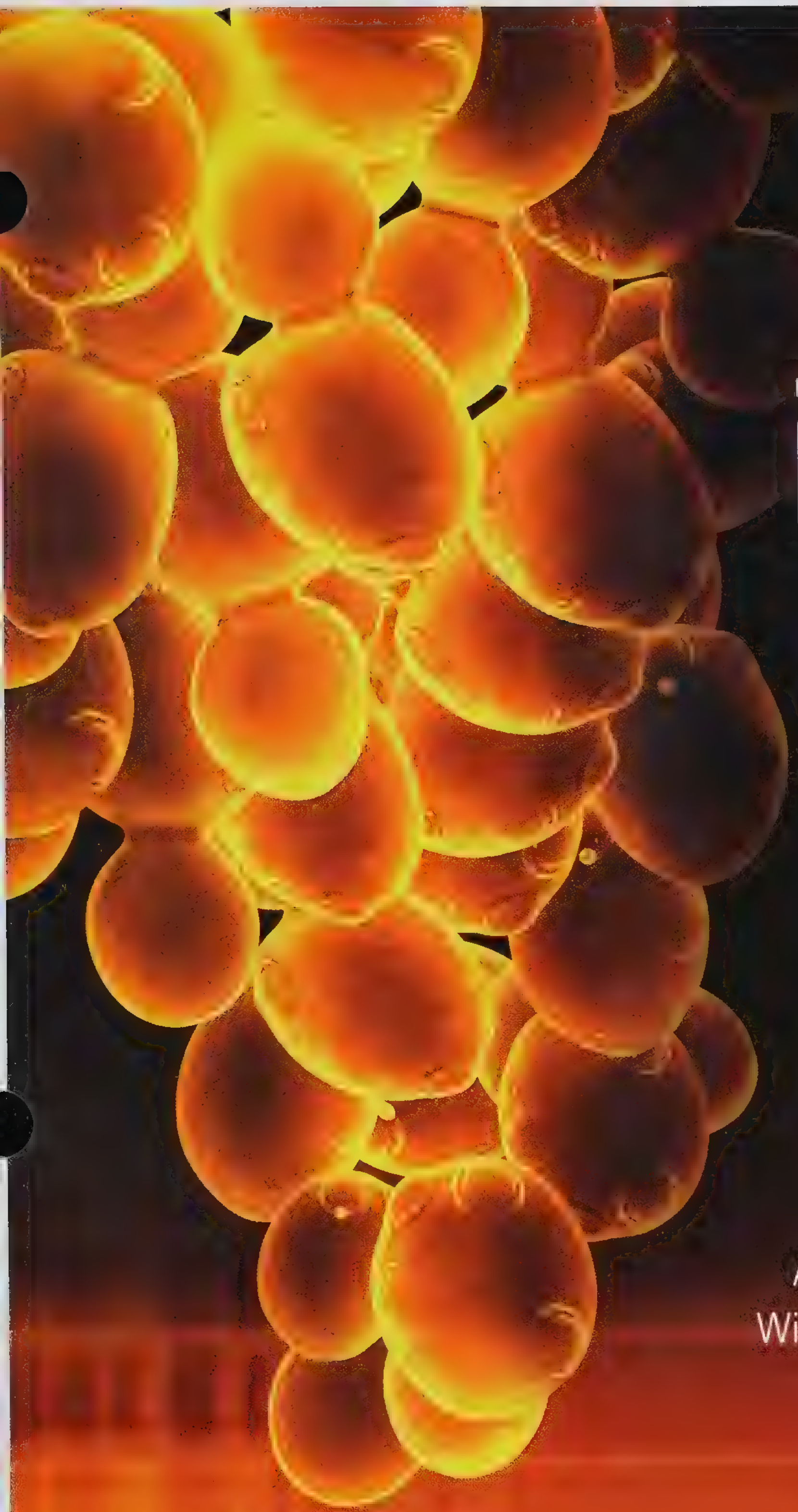

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TABLE II. Characteristics of aching pain for vineyard workers in Napa and Sonoma counties who reported musculoskeletal symptoms (n = 116)

	1997		1998	
	Preharvest	Postharvest	Preharvest	Postharvest
	mean/median (sd)			
Symptom severity (1–5)	1.5/2.0 (1.3)	2.8/3.0 (0.8)	2.5/3.0 (1.3)	3.0/3.0 (0.8)
Body locations affected (possible = 33)	1.6/1.0 (1.6)	2.5/2.0 (1.6)	2.1/2.0 (1.4)	3.2/2.0 (3.0)
Symptomatic days out of last 30	8.9/3.0 (11.2)	16.2/15.0 (5.5)	13.6/15.0 (10.9)	17.1/15.0 (8.4)
Symptomatic days out of last 7	3.4/3.0 (3.5)	3.1/3.0 (2.7)	4.2/4.0 (3.3)	3.3/3.0 (2.8)
Composite symptom severity score	66.0/30.0 (99.0)	129.8/90.0 (122.2)	37.7/0.0 (105.4)	66.2/0.0 (165.9)

Research Center (UC AERC) has conducted a program of ergonomics research and intervention in agricultural workplaces, with a special focus on preventing back injuries. The focus of these projects has been to identify ergonomics risk factors associated with injury, and then to design and demonstrate low-cost engineering interventions to modify tools or tasks within existing production practices.

Early UC AERC projects focused on plant nurseries and wine grape vineyards, in which researchers found evidence of extremely high rates of musculoskeletal disorders (MSDs): 40 per 1,000 workers (4%) in nurseries and floriculture, and 80 per 1,000 workers (8%) in vineyard operations (for a complete definition of MSDs see glossary).[14] These are reported injuries only, and are well above the rates targeted by the U.S. Public Health Service,[17] in Healthy People 2000, of an incidence of no more than 60 MSDs per 100,000 workers (0.06%).

Injury records for 194 permanent vineyard workers were reviewed for evidence of MSD incidence; these records spanned 2.5 years for two employers and 1.5 years for another. This preliminary study showed the presence of serious risk exposures for a variety of MSDs. Twenty-nine MSDs were defined for 28 (14%) of the workers studied, representing 435 lost workdays. Back injuries comprised most (69%) of the MSDs, with lifting

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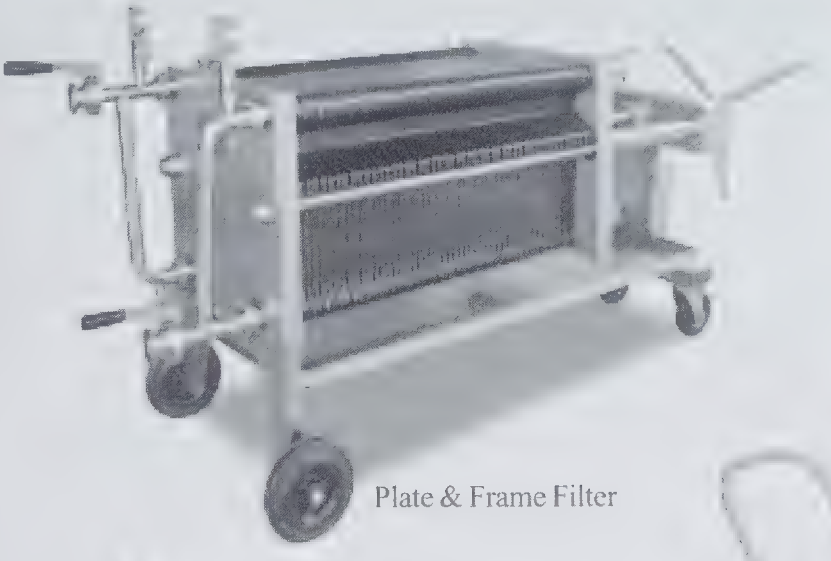

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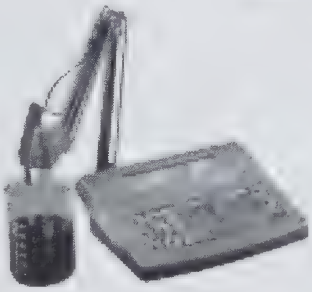

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during wine grape harvest cited as a predominate cause.[14]

Hand-harvesting wine grapes

Hand-harvest work is the most physically demanding and intense period during the annual winegrape crop cycle. Workers move rapidly down a vine row, reaching to grasp grape clusters and cutting them free with a small, curved knife. Grapes are dropped into plastic tubs that are moved along with sideways leg thrusts.

When a tub is filled, the worker lifts and carries it to the gondola (usually on the other side of the picking row), then lifts the tub over his head, leans his body against the vine, and dumps the grapes over the top of that vine into the gondola on the other side. The worker then walks or runs back to his place on the row.

Workers make 25 to 50 cuts per minute when picking, and tub weights of up to 80 pounds have been recorded in the field. The job also requires constant forward leaning of the upper torso while locating and cutting grapes. The working heart rate for this job was measured at 119 beats per minute (BPM), which is 70% higher than a normal resting heart rate of 70 BPM for a healthy young adult. This heart rate is in the range of that for aerobic exercise and is maintained for 6- to 12-hour shifts (except for breaks).

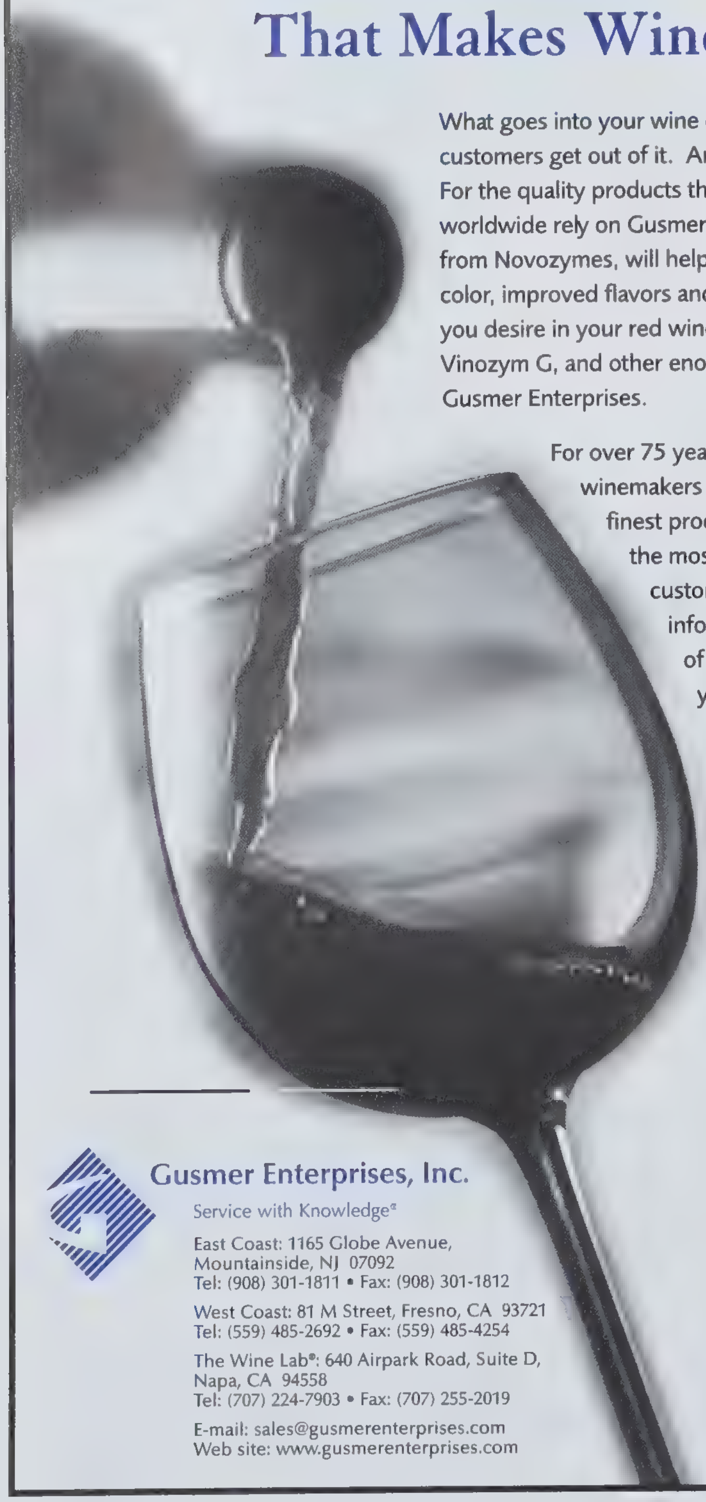
All of these ergonomic risk factors offer opportunities to improve physical efficiencies and reduce strains on the body. However, the repeated heavy lifting and carrying of the filled tubs has been noted as a significant factor in back-injury risk by ergonomists, workers and supervisors, and employer injury records. Focusing on lifting and carrying of the tubs also offered an opportunity to test the theoretical suggestion that loads should be reduced to less than 55 pounds, over which destructive effects on the spine become disproportionately dangerous.[4]

Lightening the load

At first glance, it seems obvious that lightening of the loads that are lifted or carried would reduce back-injury risk, and research supports this approach. However, the problem is more complicated in that workers handle heavier loads differently than lighter loads. Compared to heavier loads, lighter loads may be moved with more bending, velocity, and twisting.

Additionally, load management is only one part of this complex job task. In changing the way they manage the load, workers become more exposed to other risk factors (for example, more time cutting in a stooped posture) and experience less rest and recovery time.

Finally, recent theoretical and research evidence suggests that there is a spinal-loading threshold that may have disproportionate effects on the human spine. K. G. Davis and W. S. Marras con-



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[illegible] Camino Dorado Ave. Napa, CA 94558 • 707 [illegible] • www.collopack.com ducted research on 15 college-age males handling loads of differing weights ranging from 20 to 92 pounds.[4] They found that small increases in load weight (6 to 20 pounds) across the range were offset by altered body mechanics (differences in load handling) and yielded little difference in spinal loading (forces acting on the spine).

They found that load weights fell into two distinct groupings: those below and above 55 pounds. Loads at or exceeding 55 pounds were found to cause significantly more spinal loading and physical stress. In their words, "there appeared to be a weight threshold at 25 kilograms [55 pounds] at which spinal loads became increasingly risky."

Because of this trial's small number of subjects, it is too early to be certain that this proposed threshold applies to the general population. However, the concept of a weight threshold is a new way of thinking about load reduction and its effects. Given that farmworkers must routinely lift and carry significant loads, the approach deserved testing in an agricultural setting, especially if lightening a load across this threshold might involve increasing exposure to other risk factors.

Because the Davis and Marras research was preliminary, for our research we decided to use a 50-pound weight target. This provided us with a 5-pound safety margin for fieldwork, to be responsible regarding subject safety; given our results, we stand by the 50-pound target figure for field (as opposed to laboratory) applications.

Smaller picking tub

Rather than attempting to train workers to load fewer grapes per tub, the engineering intervention we proposed consisted of using smaller plastic tubs for carrying cut grapes during hand-harvest.

Several intervention-tubs were subjected to an informal field trial with workers in Napa and Sonoma counties during the 1997 harvest to gain worker-input to tub evaluation. A satisfactory, commercially available tub was found, which is 2 inches narrower front to back and 1 inch narrower side to side than the standard tub currently used in California vineyards. Both tubs are 8 inches high, and the external dimensions are 24 inches by 14 inches for the intervention tub and 25 inches by 16 inches for the standard tub (see photo on page 8).

The intervention-tubs were 13% smaller in volume than standard tubs, resulting in a seasonal average reduction in load weight of 11 pounds (from 57 to 46 pounds) for the tub and its contents. While this is a relatively small weight decrease, it brought average loads below the 50-pound threshold.

However, because the intervention-tub was smaller, workers would have to make more lifts and carries during each shift to maintain their productivity, as measured in pounds of grapes. The intervention-tub was filled in slightly less time than a standard tub: an average of 2 minutes 46 seconds compared to 3 minutes 12 seconds. This means that lifting frequency was slightly greater for the intervention-tub than for the standard tub: 21.68 lifts per hour versus 18.75 lifts per hour. Therefore, lifting repetition would be increased as a trade-off for lowering the weight per lift.

Furthermore, because it is narrower front to back, the intervention tub is carried closer to the body, bringing the load's center of gravity closer to the body. It also has a smooth bottom (as opposed to some standard tubs that are bifurcated with two ribs), making it easier for workers to slide a tub across the ground with their legs while moving along a vine row.

This sliding occurs three to five times per tub load (depending on grape variety), and places high shear forces (forces that are applied in the right-to-left or forward-to-backward direction within the body) on the back and knee. The intervention-tub requires about 2/3 as much sliding force as a standard tub (13 pounds compared to 19 pounds on level ground).

Intervention trial design

The intervention evaluation was designed as a pre- and post-trial with each worker serving as his or her own

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control. More than 200 harvest workers from three wineries and one vineyard-management company in Napa and Sonoma counties participated in the intervention trials. Harvest trials consisted of one season using the larger standard tub (1997) and two seasons using the smaller intervention tub exclusively (1998 and 1999).

Preliminary results from the 1998 intervention-tub trial, when compared with the 1997 standard-tub trial, suggested that the decrease in tub size was having a significant positive effect. However, there was concern that the total crop was significantly lighter in 1998 due to the El Niño weather phenomenon, which may have meant that workers were not taxed as hard as they were in 1997 (a heavy crop year).

To ensure the validity of trial results, a second trial was done using the intervention-tub in 1999. For the biomechanical and postural analysis, we applied two standardized instruments, the Lumbar Motion Monitor (LMM)[12] and the revised National Institute of Occupational Safety & Health (NIOSH) Lifting Equation,[19] to the harvest-tub lifting and carrying task.

Lumbar Motion Monitor (LMM) — It is often difficult to apply research instrumentation in a working environment. For example, the LMM consists of an exoskeleton worn by the subject (see Glossary page 00, photo page 00). Neither workers nor their supervisors wanted work inhibited during the important harvest period, when workers are paid on a piece-rate basis. Therefore, LMM measurements were conducted in a simulation of a working vineyard.

Weighted bags were attached to vine cordons to substitute for grape clusters. To simulate grape harvesting, ten experienced workers wearing the LMM-exoskeleton filled picking tubs with the bags, lifted and carried the tubs, and dumped the contents into a container placed at the same height as field gondolas. Lift frequency was standardized for all workers. By making the simulation simulate real field conditions, workers wearing a LMM performed the same movements at the same pace as workers observed during harvest.

The LMM is essentially a tri-axial electrogoniometer that quantitatively describes movement of a subject's trunk in three dimensions as the task is performed. The LMM acts as an exoskeleton of the spine, which continuously tracks position (degrees of motion) and velocity and acceleration (degrees of motion per second). This instrument was primarily used in this study to supplement the description of hand-harvest task ergonomics.

Associated with LMM data is a model based on five years of research with workers at Ohio State University, which has been shown to predict whether a lifting job is likely to result in a high back-injury rate.[16] This model reports predicted injury likelihood as percentage probability and is also now accepted in the field as a standardized instrument.[11]

NIOSH Lifting Equation — The NIOSH Lifting Equation uses quantitative data describing the human performance of a lifting task to calculate a recommended weight limit for that task.[18,19] The recommended weight limit is defined as the load weight that most healthy workers could sustain for a period of up to eight hours without increased risk of lower-back pain. The real load weight is then divided by the recommended weight limit to produce a lifting index (LI) for the tub-lifting task that describes the physical stress experienced by workers. This equation was used to calculate LI figures for the task using both standard and intervention tubs.

An LI of 1.0 is considered normal; results below 1.0 are positive while those above are negative in terms of worker health outcome (an LI greater than 1.0 poses an increased risk for lifting-related lower-back pain and injury for some fraction of the workforce). The NIOSH Lifting Equation is also recognized as a standardized instrument.

Health effects analysis

There are several reasons why it is difficult to assess occupational MSDs related to ergonomics intervention in

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agricultural settings. First, work-related MSDs can take months or years to develop, making it unlikely that reportable or diagnosable injuries would be reported during the study period.

Moreover, it is unlikely that employer health records provide an accurate picture of MSD-incidence among agricultural workers due to a class-based and cultural propensity to disregard physical discomfort. In addition, workers in discomfort often utilize self or home remedies rather than seeking help from organized community health-care systems.

Symptom Survey — To enhance our power to test differences in musculoskeletal outcomes, a musculoskeletal symptom survey developed and used in prior NIOSH-funded studies (see Glossary, page 00) was used.[6] The survey was designed to be compatible with the cultural, linguistic, and educational characteristics of Hispanic field workers in California agriculture.

The survey is delivered in English or Spanish by interview; uses previously tested measures of pain severity, location, and duration; and includes items to assist with determining the work-relatedness of the symptoms.

The Spanish translation of the survey underwent extensive forward and backward translation with focus groups of California farmworkers to ensure the appropriateness of the vocabulary and syntax. As with any self-reported survey method, there is potential for subjective bias on the part of a respondent and interviewer. Still, this approach has demonstrated sensitivity in its potential for capturing changes in MSD symptom development and characterization.

Workers were given symptom surveys at the beginning and end of each harvest period (approximately eight to ten weeks in length), and the change in symptoms was computed for each harvest. From fall 1997 to fall 1999, 263 workers participated in this part of the study. In fall 1997, 195 workers completed both the pre- and postharvest surveys. In 1998, complete pre- and post-harvest interviews were done with 116 workers who had participated in fall 1997. In fall 1999, we were able to re-interview 66 workers who had participated in both the 1997 and 1998 harvest-season interviews.

Complete data was available for 115 workers at the end of 1998 and 64 workers at the end of 1999 (including pre- and post-harvest data for each preceding year). Workers who completed all interviews did not differ statistically from those who only completed the initial survey interviews in 1997, in terms of their demographics (age, years in the U.S., years worked in vineyards, and years worked in California vineyards).

Productivity Analysis — Productivity impact was assessed by monitoring the tons of grapes picked by participating crews on a daily basis. Tons picked and

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Intervention and standard tubs

ERGONOMICS — Our ergonomics assessment of intervention-tub use showed large reductions in targeted risk-factor exposures. Weight was reduced 19%, from 57 pounds on average for a standard tub to 46 pounds for an intervention-tub. Sliding force was reduced 32%, from 19 to 22 pounds for a standard tub, and 13 to 16 pounds for an intervention-tub.

Application of the NIOSH Lifting Equation yielded an LI reduction of one full point (from 3.4 to 2.4), indicating decreased risk of injury. This was echoed by the 4% to 5% decrease for the LMM-associated calculation for back-injury probability (from 0.64 to 0.60).

MSD SYMPTOMS — As expected, there was no significant reduction in the incidence of reported or diagnosed MSDs during the study period. In contrast, symptom reporting was relatively frequent, with aching by far the most common MSD symptom reported by workers (Tables I and II).

Of 95 workers who began the 1997 standard-tub harvest with no MSD symptoms, 66 (70%) reported symptoms post-harvest. In contrast, of 90 workers who began the 1998 intervention-tub harvest with no symptoms, only 26 (29%) reported symptoms post-harvest.

Detailed statistical analysis comparing the 1997 standard-tub trial and 1998 intervention-tub trial showed that the latter resulted in significant improvements in symptom scores ($t = 6.310$, $P < 0.001$). The frequency of symptom reporting for the back and knee areas, body regions affected by a significant application of force related to lifting tubs full of grapes, showed reductions in the 1998 post-harvest period of 50% (Table I).

Because the harvest was lighter in 1998 than 1997, MSD symptom data for the intervention-tub was collected in 1999, when the harvest volume was more normal. A comparison of symptom scores between the 1997 standard-tub-trial baseline year (70% increase) and 1999 intervention-tub trial (46% increase) again demonstrated significant improvements with use of the intervention tub ($t = 3.127$, $P < 0.002$).

These findings demonstrate that many workers experience work-related MSD symptoms during a wine-grape harvest period and that these symptoms grow worse over the course of harvest. Both the onset and exacerbation of these work-related symptoms were reduced with introduction of an intervention tub.

PRODUCTIVITY — Use of the smaller intervention-tub resulted in slightly decreased productivity, as measured in pounds delivered to a gondola per shift. There was a mean reduction in grapes delivered to a gondola of 168 pounds per 8-hour work shift (average

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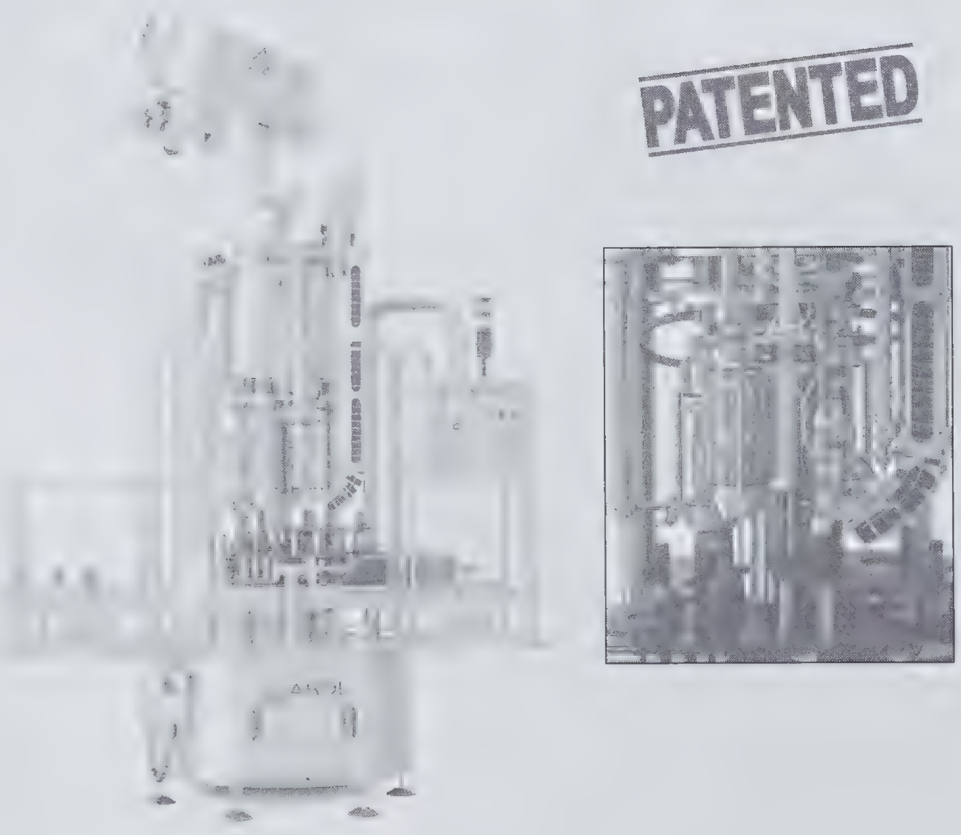

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shift total of about 7,000 pounds per worker before intervention).

During the field trials, neither workers nor owner/operators perceived any productivity difference. This is likely because the decrease was small (2.5%). Also, field time is not the highest concern to workers or management since payment is for tons delivered, not hours worked.

Because the intervention-tub can hold an average of 11 pounds less grapes, it fills faster than the standard tub and workers make about three more trips to a gondola per hour to achieve the same productivity. However, even though workers made more trips per shift, their energy expenditure (as estimated from heart-rate changes), and MSD symptoms decreased over those recorded for standard-tub use.[7]

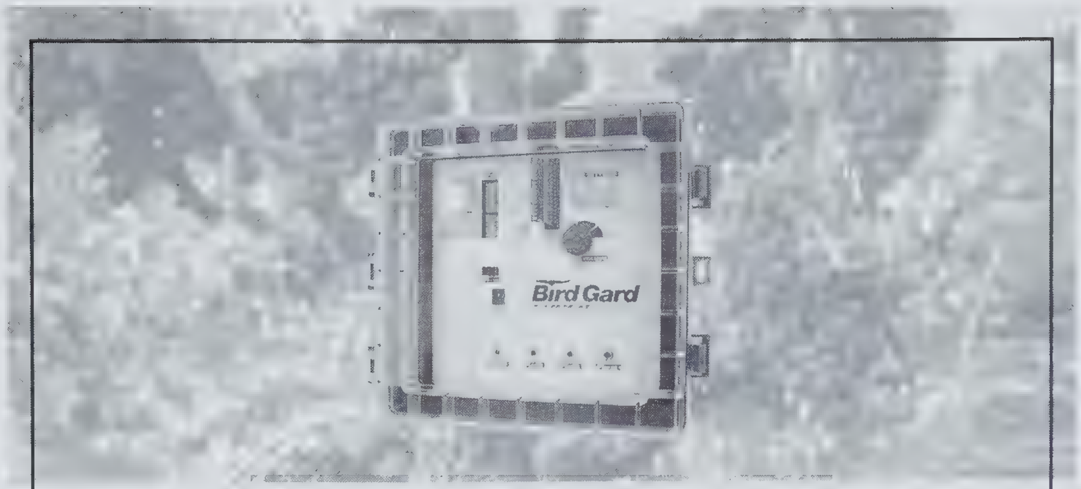
High risks to workers

Because MSDs are chronic, it would be overly optimistic to expect large reductions in their reported incidence over an eight to 10-week harvest period. For that reason, we relied on our original approach to assessing MSD symptoms — an individual survey administered in Spanish by trained interviewers.

The MSD-symptom measure is particularly relevant for this group of Hispanic workers, who do not generally recognize early discomfort as symptoms of a disorder and potential impairment, and are reluctant to report injuries.

Many workers who did not report symptoms in an interview had undertaken self-treatment. These workers do not identify their sensations as symptoms of health disorders or report them as such for cultural, educational, and occupational reasons. These workers have a strong work ethic and are fearful of losing workdays or even their jobs.

Additionally, focus-group participants reported that unless painful symptoms are genuinely work disabling, it is unlikely that they will be reported as painful (*dolor* in Spanish); more frequently such sensations are reported as bothersome (*molestias*) and are regarded as commonplace occurrences to be endured rather than treatable disorders. The survey and our data collection process took these cultural variations into account.



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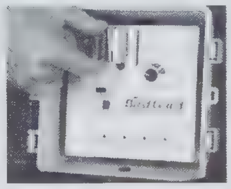

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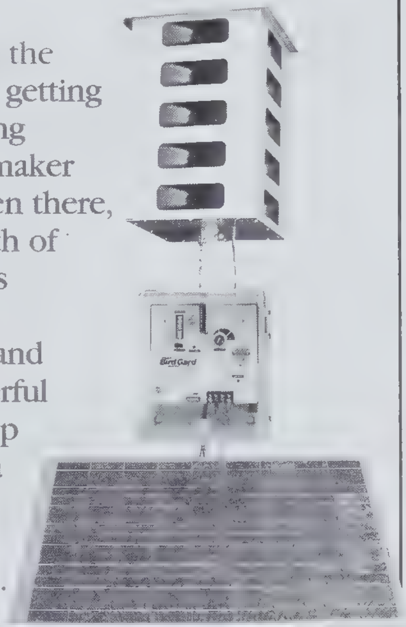

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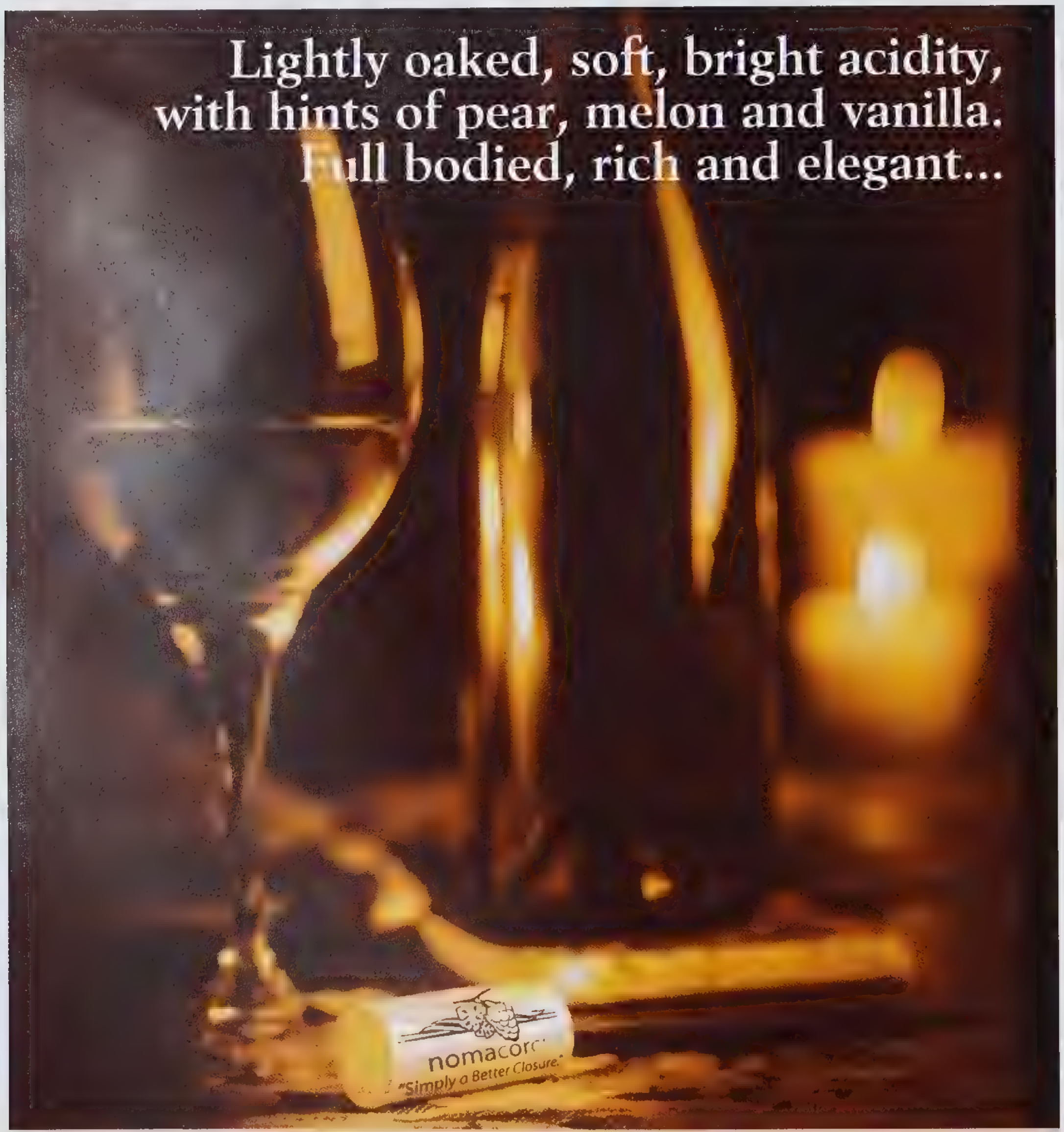
While our sample of vineyards was not randomly selected and may not be fully applicable to the industry, a suggested MSD incidence rate of 80 per 1,000 workers per year indicates a priority need. This is well above the rates targeted by the U.S. Public Health Service for an incidence of no more than 60 MSDs per 100,000 workers, and it confirms years of anecdotal evidence that field agricultural jobs are physically demanding and take a physical toll.[17]

Our findings confirm our belief that a large proportion of reported sprain/strain (injury type) and overexertion injuries (injury cause) are indicative of high MSD incidence.[1] Furthermore, they help explain why so few workers perform these jobs beyond age 35 and raise our concern that we will find similarly high levels of MSD symptoms in other agricultural field jobs.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These results point to a significant opportunity to reduce the risk of back injury in all jobs that require repeated lifting of heavy loads by reducing load weights to 50 pounds or less.

Safer winegrape harvest

Manual winegrape harvesting is highly strenuous and physically demanding work, involving exposure to serious risk factors for chronic back injury. Winegrape harvesting involves all three of the priority ergonomics risk factors observed in other agricultural work: full-body stooped posture, highly repetitive hand-work, and manual lifting and carrying of heavy loads. Our findings show the physical impact of this work as a large increase in MSD symptoms during the 1997 standard-tub trial, with 70% of workers reporting symptoms.

Using ergonomic methods for risk-factor assessment and tool design, we reduced average tub weights by 19% to below the prescribed 50-pound threshold. This resulted in a two- to five-fold reduction in workers' post-harvest symptom scores. Most importantly, at the end of the 1998 intervention-tub trial, both areas of significant force application related to tub lifting, back and knee, showed reductions of 50% in reported symptoms. These are large-magnitude health outcomes by any measure, and were achieved with no increase in symptoms for other body regions. Participating workers remarked upon this during the course of harvest.

Nonetheless, while tub substitution resulted in an improved NIOSH Lifting Equation outcome from an LI of 3.4 to 2.4, it still left workers with an elevated risk of back injury (that is, exceeding the target LI of 1.0).

Equally important, the workers, whose endorsement of change is critical to the long-term success of an intervention, accepted the use of the smaller intervention tub. Despite a 2.5% decrease in worker productivity (measured by pounds of grapes per shift), neither workers nor managers remarked upon this.

Because workers are paid on an incentive rate per ton rather than time, this decrease was of minor interest to managers. Because workers prefer the smaller tub for its easier manageability, they reported that the productivity decrease was not of critical interest either.

All of the companies cooperating in our project have permanently adopted the smaller picking tubs, which are commercially available, as have other vineyards throughout Napa and Sonoma counties. Taken all together, these results present a strong argument for reducing loads lifted or carried by

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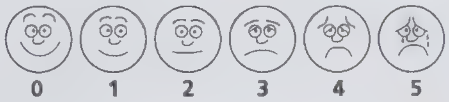
GLOSSARY

Ergonomics: The science of work, which can refer to: removing barriers to quality, productivity and human performance by fitting products, tasks, and environments to people; fitting the task or tool to the person; planning work so that it fits the body's physiological efficiencies; and optimizing worker well-being and productivity.

Health and symptom survey: Focuses on worker reports of types and degrees of musculoskeletal symptoms in different parts of the body. Given in Spanish by trained interviewers, the survey uses visuals to help overcome cross-cultural misunderstandings. Workers circle areas on a body diagram to indicate where they experience pain and other symptoms. Intensity of pain is characterized by use of the FACES scale:



Lumbar Motion Monitor (LMM): Used to gather functional objective and quantitative measurements of the lumbar range of motion, velocity and acceleration in the work environment. The LMM consists of an exoskeleton that straps to a worker's back and has potentiometers for measurements in three dimensions: 1) range of motion of the worker's back, in terms of side-to-side, twisting and back-and-forth movements; 2) velocity, the worker's speed; and 3) acceleration, the worker's speed divided by time.

Musculoskeletal disorder (MSD): May affect muscles, tendons, joints, nerves and related soft tissues anywhere in the body. Because repeated exposure to force at the same muscle, tendon or region may result in trauma, injury and inflammation, names such as cumulative trauma disorder, repetitive motion injury and repetition strain injury have been applied to these disorders.

Diagnoses most commonly associated with MSDs include: tendonitis or inflammation of a tendon; bursitis or inflammation of the sack surrounding a joint; nerve entrapments such as carpal tunnel syndrome (which pinches the median nerve at the wrist) or cubital tunnel syndrome (which pinches the ulnar nerve at the elbow); myalgia or muscle pain, also referred to as muscle strain, tension neck, or neck and shoulder syndrome.

hand (especially where repetition is a factor) to 50 pounds or less. ■

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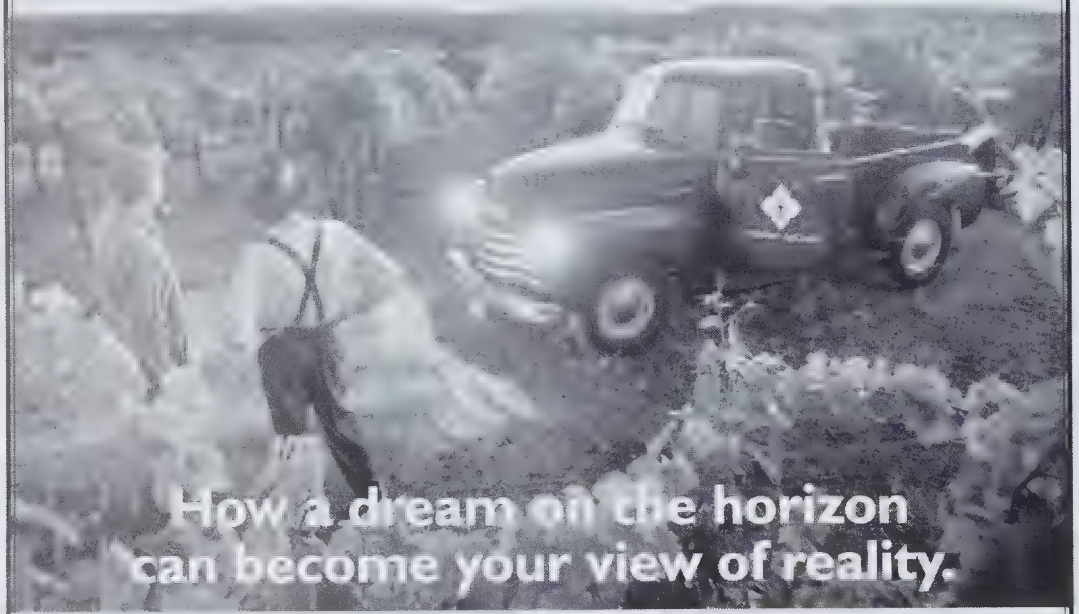
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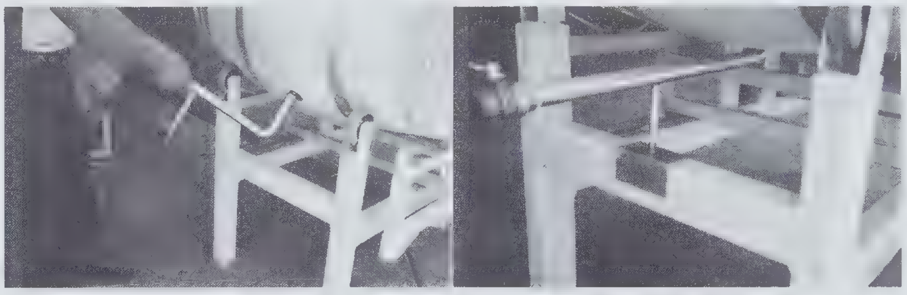

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"Extended" winegrape ripening

BY Stan Grant, Progressive Viticulture

"Hang time" or extended ripening of winegrapes has been a controversial issue in the wine industry for the last few years in California. It has been the topic of numerous articles in trade publications, the focus of several industry meetings, and the subject of heated debates. During the 2005 growing season it was the focus of numerous research projects (Table I).

Extended winegrape ripening is the practice of allowing fruit (usually red wine grapes) to remain on the vine beyond conventional harvest times. During extended ripening, soluble solids increase above traditional levels of 23° to 25° Brix.

Extension of the ripening period has become more prevalent in recent years. This California trend parallels a similar trend in Australia.[11] The practice is driven by wineries in pursuit of softer, rounder tannins, a preponderance of ripe fruit flavors, an absence of vegetative flavors, and the perception that longer residence time on the vine is the best or only means to these ends.

There are several difficulties associated with extended ripening and therein lies the controversy. For grape growers it means increased risk of fruit damage and disease. More importantly, fruit yields usually decline during extended ripening and, correspondingly, so does a grower's income.

Difficulties, however, are not limited to the vineyard. High sugar musts are prone to stuck fermentations and higher volatile acidity.[43] Higher alcohol wines are subject to higher taxes. High alcohol can be mitigated, but not without complications. Addition of water, prior to fermentation, creates potential perception issues with wine consumers, while blending and de-alcoholization increase production costs and additional wine quality risks.

As sometimes happens in the wine business, practice precedes full knowledge. Until recently there have been no research projects specifically addressing extended winegrape ripening and, given its complexity, recent research can be expected to only scratch the surface.

In January 2005, the California Association of Winegrape Growers (CAWG) conducted a literature search and review focused on extended winegrape ripening.[12] They were able to glean some information from a few of sources that included the general horticulture literature, varietal surveys that included one or more early ripening varieties, studies that barely extended beyond conventional ripeness, and that followed only a single parameter to high sugar levels.

Overripe Zinfandel cluster.

Below a is summary of our current knowledge of extended ripening based on the CAWG effort and preliminary findings from recent research. We will begin with some definitions.

Definitions

Maturation — the developmental processes in which fruit changes from the immature to the mature state with viable seeds.[21,30,50]

Mature — the state of fruit at the end of maturation.[50]

Ripening — the alteration of mature fruit from an unfavorable to a favorable condition with respect to firmness, texture, color, flavor, and aroma.[50] Ripening is a senescence process controlled by hormones.[30]

Ripe — the optimum developmental state or chemical and physical condition for the intended enological use of the fruit.[3,10,50,52]

Overripe — too ripe, the physical and chemical condition of fruit after the optimum for the intended enological use.[10,50,52]

Maturity, ripeness, and overripeness

There is an important distinction between mature fruit and ripe fruit. Fruit maturity is an objective state distinguished by seed viability, while ripeness is a subjective state dependent on the intended use or wine style. Therefore, ripeness is at the discretion of winemakers and, by appearances, so is overripeness. Overripe fruit, however, has some defining physical and chemical attributes to be discussed later in this report.

Overripeness is seldom an issue for cool climates and short growing seasons where grapes often struggle to attain ripeness.[18] Even in California, extended ripening is not possible in all seasons or for all varieties within a given growing region.[2,27,46,49]

Yield loss during extended ripening

Maximum yield generally occurs between 20° and 22° Brix, but may vary depending on vineyard location and variety.[5,9,26] Berries shrivel and lose weight during extended ripening (Figure I).[7,10,14] Weight loss is mainly due to water lost through transpiration, but

Table I. 2005 Extended winegrape ripening research projects

Researcher	Region	Crush Dist.	Variety	Number of Trials	Trial Location
Mark Battany	Central Coast	8	Cab. Sauv.	1	San Luis Obispo
Mark Battany	Central Coast	8	Merlot	1	San Luis Obispo
Mark Battany	Central Coast	8	Syrah	1	San Luis Obispo
Keith Patterson	Central Coast	8	Pinot Noir	1	San Luis Obispo
Erica Lundquist	North Coast	2	Cab. Sauv.	1	Lake
Rhonda Smith	North Coast	3	Merlot	3	Sonoma
Ed Weber	North Coast	4	Cab. Sauv.	5	Napa
Paul Verdegaal	Northern Interior	11	Cab. Sauv.	1	San Joaquin
Paul Verdegaal	Northern Interior	11	Merlot	1	San Joaquin
Paul Verdegaal	Northern Interior	11	Syrah	1	San Joaquin
Terry Prichard	Northern Interior	11	Syrah	1	Sacramento
Donna Hirschfelt	Sierra Foothills	10	Zinfandel	1	Amador
Sanliang Gu & Bob Wample	South S. J. V.	13	Cab. Sauv.	1	Fresno
Sanliang Gu & Bob Wample	South S. J. V.	13	Merlot	2	Madera, Kern
Sanliang Gu & Bob Wample	South S. J. V.	13	Syrah	3	Fresno, Madera, Kern
			TOTAL FIELD TRIALS	24	

likely involves reduced inflow through the vascular tissues of the cluster stems.[14,35]

Weight loss is highly variable and can be substantial (Table II). Prevailing weather conditions during extended ripening and crop load appear to affect the rate and extent of yield loss.[15] Yield loss varies with variety,[5,13,46] and within a given variety and region by vineyard location.[49] Vineyard design factors, such as vine spacing, training, and trellising also effect yield loss during extended ripening.[46]

Perhaps the most precise and practical means for dealing with yield losses associated with extended ripening are the water additions required to decrease high soluble solids to conventional levels.

Progressive Viticulture has developed a yield loss model based on cluster weight partitioning and a U.S. Depart of Agriculture table of Brix and specific gravity values. The model may be used for hand-harvested or machine-harvested grapes.

For example, the water addition required to decrease a hand-harvested, 28° Brix grape must to 23.5° Brix is

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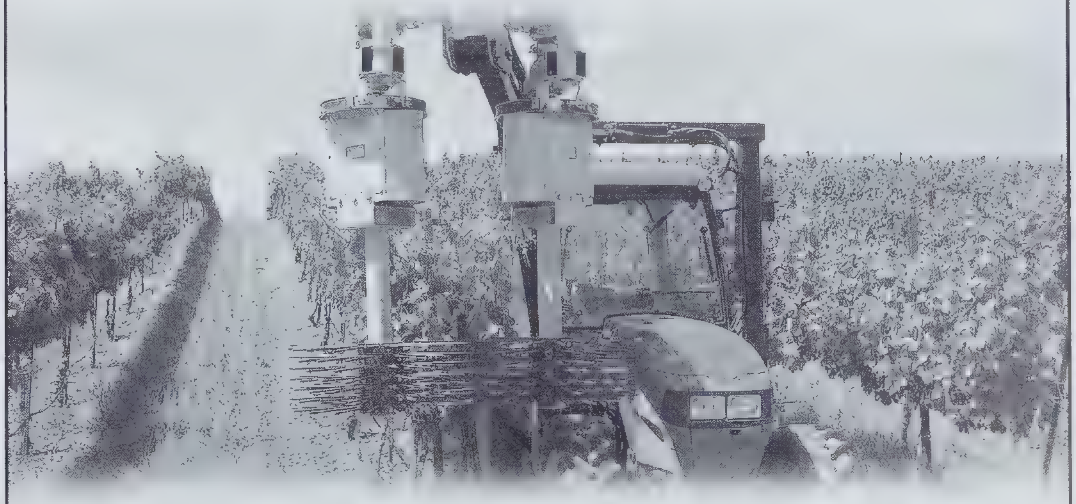

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Table II. Yield loss per unit soluble solids in several studies[1]

Variety	Battany[2]	Dokoozlian[3]	Gu & Wample	Hirschfelt	La Rosa & Nielson	Lundquist	Prichard, et. al.	Richardson & Anthony	Verdegaal	Weber
Cab. Sauv.	6.7	0.8 to 3.0	4.3 & 5.5			0.0			3.5 to 16	0.0 to 6.9
Merlot	5.1	0.6 to 3.0	0.3 & 4.2						18 to 29[3]	
Syrah	3.6	1.1 to 1.8	2.5 & 3.3				6.0 to 6.5	3.1 to 5.2	1.1 to 8.7	
Zinfandel				32[5]						
Grenache					3.9 to 11					

[1] References: 2, 5, 13, 15, 23, 27, 32, 33, 42, 46, 49

[2] Based on berry weights

[3] Combination of two years data (2004 & 2005). Peak yield occurred at ≈ 22° Brix

[4] Sugar accumulation stalled, increasing only 1° Brix over 37 days, while yields continued to decline

[5] Entire loss occurred during the final 10 days of the experiment while there was negligible change in soluble solids, pH, and TA

equivalent to ½-ton per acre for an initial yield of 4.4 tons per acre.

There is some evidence that yield loss may be mitigated, at least in part, without affecting fruit flavor and aroma by soil moisture management.[5,13,46] The success of mitigation, however, appears to depend on irrigation timing and amount of water applied.[32]

Effect of extended ripening on fruit condition and chemistry

Grapes that become overripe during extended ripening have some clearly discernable physical characteristics. They tend to shrivel as they lose water. In addition, there is a loss of firmness and very soft texture that is the result of tissue senescence and breakdown.[10,30,50,52] These conditions make overripe fruit more susceptible to mechanical damage and infection by pathogens.[10,19,26,50,52]

Desiccation during extended grape ripening has a concentrating effect on most soluble compounds, while metabolism consumes others, causing their decline. Both of these affects are

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evident for sugars, which are by far the most plentiful solutes in grape berries. Soluble solids, which is mainly a measure of sugars, continues to increase during extended ripening, even though their synthesis is believed to have ceased.[4,7,10,14]

However, the increase is almost entirely due to fructose, because glucose levels decline in overripe fruit.[7,14] The ratio of glucose to fructose, which was greater than 1.0 during maturation and near 1.0 at ripeness, becomes less than 1.0 during overripening.[14]

Titratable acidity, which dramatically decreases after veraison, decreases at a moderate rate during extended ripening presumably due to berry desiccation.[7,14,27,32]

With the loss in acidity there is a corresponding increase in fruit pH. The decrease in acidity is almost entirely due to loss of malic acid, because the tartaric acid level remains stable.[7,14] The loss in acidity during extended ripening is of less magnitude than the increase in sugars, causing a rise in the ratio of sugar to acid.

Flavor and aroma development in grape berries appear to be environmentally-regulated (light and heat) by enzyme activity and unrelated to changes in sugars and acids. Vegetative flavors and aromas degrade slowly after veraison and, depending on weather and vineyard factors, may or may not be present during extended ripening depending on climate and vineyard conditions.[4]

Floral aromas appear to reach a maximum at ripeness and decline during extended ripening.[10,14] Jammy, prune, date, and raisin are the flavors typically associated with extremely ripe fruit.[3] These dried fruit flavors evolve after the typical ripe fruit flavors.[3,36]

General fruit development trends during ripening and overripening are presented in Table III.

Extended ripening and fruit quality

There are many and varied opinions regarding the impact of extended ripening on grape and wine quality.[6,8,9,16,24,25,33,34,40,41,45] In contrast, pertinent research is scant. Intensified ethanol aromas, bitterness, viscosity, and black pepper and berry flavors were the main influences of overripeness in Zinfandel wine.[31]

Shortened post-harvest periods

An extended ripening period takes time away from the post-harvest period. During the post-harvest period, vines continue to convert sunlight into carbohydrates and a large percentage of these carbohydrates are stored in the permanent woody vine tissues for use during the following growing season.

A portion of the mineral nutrients taken up from the soil after harvest is also stored for subsequent use. Some winegrape growers have been concerned that shortened post-harvest

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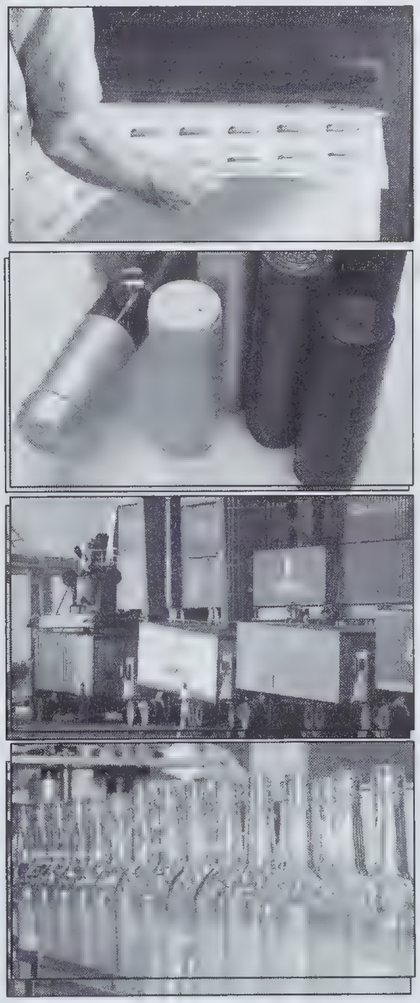

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Table III. Changes in grape berries during maturation, ripening, and overripening

	During Ripening		During Extended Ripening (overripeness / senescence)	
	Trend	References	Trend	References
BIOMASS	↗	Mullins, et. al. (1992), Winkler, et. al. (1974)		
Fresh weight	↗	Coombe (1992), Christensen, et. al. (1995), Jensen, et. al. (undated a), Jensen, et. al. (undated b), Singleton (1966), Winkler, et. al. (1974)	↘	Bisson (2001), Coombe & McCarthy (1999), Kennedy, et. al. (2000a), Kennedy (2004a), Jensen, et. al. (undated a), La Rosa & Nielson (1956)
Water	↗	Coombe (1975), Coombe (1992), Hamilton & Coombe (1992), Winkler, et. al. (1974)	↘	Coombe (1975), Galet (2000), Hamilton & Coombe (1992)
Dry weight	↗	Coombe (1992), Mullins, et. al. (1992), Williams (1987)		
Soluble constituents	↗	Coombe (1975), Coombe & McCarthy (2000)	↗	Coombe (1975)
Soluble solids	↗	Coombe (1975), Jackson & Lombard (1993), Kliewer (1965b), Pirie & Mullins (1977), Singleton (1966), Westwood (1993), Winkler, et. al. (1974)	↗	Coombe (1973)
Must density or specific gravity	↗	Galet (2000)	↗	Galet (2000)
PHYSIOLOGICAL CHANGES				
Sensitivity to ethylene	↗	Westwood (1993)		
Chlorophyll	↘	Hamilton & Coombe (1992), Mullins, et. al. (1992), Westwood (1993), Uhlig & Clingeleffer (1995)		
Photosynthesis rate	➘	Mullins, et. al. (1992)		
Respiration rate	➘	Geisler & Radler (1963), Mullins, et. al. (1992), Westwood (1993)	➚	Inoescu (1968)
Osmotic potential	↘	Mullins, et. al. (1992)		
Cell expansion	↗	Mullins, et. al. (1992), Winkler, et. al. (1974)		
Cell division	→	Harris (1968), Mullins, et. al. (1992)		
Cell wall integrity	↘	Mullins, et. al. (1992)		
Xylem tissue functionality	↘	Creasy, et. al. (1993), Mullins, et. al. (1992), Kennedy (2002), Lakso, et. al. (1995)		
Invertase activity	↗	Mullins, et. al. (1992)		
Seed maturation	→ (completed at maturity)	Kennedy (2002)		

periods may lead to a decline in vine health and fruit production.

Available evidence indicates that post-harvest periods are not essential. First, during the growing season there is a net gain of carbohydrates in the roots of normally cropped vines long before the onset of extended ripening.[28,29,30,47,51] Second, carbohydrate storage in buds and canes appears the same for normally-harvested vines and unharvested vines.[48] Finally, commercial viticulture has been sustained in regions that regularly have little or no post-harvest period.[20,38]

Post-harvest periods do, however, allow for storage of additional carbohydrate reserves.[39,51] The additional storage allows vines to draw upon both currant assimilates and reserves for fruit development during the growing season, providing the basis for larger yields of ripe grapes.[17,22]

Post-harvest periods are important to grapevines compromised by pests, diseases, disorders, deficiencies, and stresses, which may alter the production of carbohydrates and their partitioning within grapevines.[30,37,51] This includes vines that were inadvertently subjected to severe water stress as a part of a deficit irrigation schedule. Post-harvest periods are critical to vines with large crops or limited leaf area.[1,17]

Conclusions

Fruit is ripe when winemakers feel it is suitable for the wine style they want to make and, in recent years, suitability has often come later than usual in the growing season. As a result, wine is increasingly made from fruit which can be considered overripe due to the following characteristics: soft texture, high soluble solids, glucose to fructose ratios less than 1.0, low titrat-

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Table III (continued)

	During Ripening		During Extended Ripening (overripeness/senescence)	
	Trend	References	Trend	References
PHYSICAL ATTRIBUTES				
Volume	↗	Coombe (1992), Coombe (2001), Coombe & McCarthy (2000), Hamilton & Coombe (1992), Kennedy (2002), Winkler, et. al. (1974)	↘	Du Plessis (1984), Rogiers, et. al. (2004)
Firmness	↘	Mullins, et. al. (1992), Westwood (1993)		
Softness (texture)	↗	Coombe (1992), Coombe & Phillips (1980), Hamilton & Coombe (1992), Mullins, et. al. (1992), Winkler, et. al. (1974)	↗	Winkler, et. al. (1974)
Deformability	↗	Coombe (1992), Coombe & Phillips (1980)		
Turgidity	→ (at low levels)	Thomas, et. al. (2004)	→	Galet (2000), Hamilton & Coombe (1992)
Adhesion to pedicel	↘	Mitchell (1979)		
Resistance to powdery mildew	↗	Chellemi & Marois (1992)		
Resistance to other pathogens	↘	Jensen, et. al. (unpublished a), Jensen, et. al. (unpublished b), Winkler, et. al. (1974)	↘	Winkler, et. al. (1974)
Resistance to mechanical injuries	↘	Winkler, et. al. (1974)	↘	Winkler, et. al. (1974)
CARBOHYDRATES	↗	MULLINS, ET. AL. (1992)		
Sugars	↗	Coombe (2001), Coombe & McCarthy (2000), Hamilton & Coombe (1992), Mullins, et. al. (1992), Westwood (1993), Winkler, et. al. (1974)	↗ (due to dehydration)	Bisson (2001), Coombe (1975), Galet (2000), Hamilton & Coombe (1992)
Sucrose	→	Coombe (1992), Westwood (1993)		
Glucose	↗	Coombe (1975), Coombe (1992), Esteban, et. al. (1999), Galet (2000), Kennedy (2002), Lacey, et. al. (1991), Westwood (1993)	→	Amerine & Thoukis (1958), Coombe (1975), Galet (2000), Hamilton & Coombe (1992), Kliewer (1965b), Webb & Coombe (1999)
Fructose	↗	Coombe (1975), Coombe (1992), Esteban, et. al. (1999), Galet (2000), Kennedy (2002), Lacey, et. al. (1991), Westwood (1993)	↗	Amerine & Thoukis (1958), Coombe (1975), Galet (2000), Hamilton & Coombe (1992), Kliewer (1965b), Webb & Coombe (1999)
Glucose/Fructose	→	Coombe (1975), Hamilton & Coombe (1992), Kliewer (1965b), Winkler, et. al. (1974)	↘	Coombe (1975), Hamilton & Coombe (1992), Kliewer (1965b), Winkler, et. al. (1974)
Pectins	↗	Coombe (1999), Galet (2000), Silacci & Morrison (1990), Westwood (1993)	↗	Galet (2000)

able acidity, high pH, low ratios of malate to tartrate, very high sugar to acid ratio, diminished floral characters, and the presence of dried fruit characters. Other compositional features of overripe fruit have yet to be adequately characterized.

Table III (continued)

	During Ripening		During Extended Ripening (overripeness/senescence)	
	Trend	References	Trend	References
ACIDS	↘	Coombe (1975), Coombe (2001), Galet (2000), Hamilton & Coombe (1992), Kliewer (1965a), Winkler, et. al. (1974)	↘	Kliewer (1965a), La Rosa & Nielson (1956), Winkler, et. al. (1974)
Titratable acidity	↘	Coombe (1975), Hamilton & Coombe (1992), Jackson & Lombard (1993), Kennedy (2004a), Mullins, et. al. (1992), Westwood (1993)	➚	Kennedy (2004a)
Tartrate	↘ & →	Coombe (1975), Esteban, et. al. (1999), Hamilton & Coombe (1992), Iland & Coombe (1988), Kliewer (1965a), Lacey, et. al. (1991)	→ or ➘	Coombe (1975), Kliewer (1965a)
Malate	↘	Coombe (1975), Galet (2000), Hamilton & Coombe (1992), Iland & Coombe (1988), Jackson & Lombard (1993), Mullins, et. al. (1992)	↘	Kliewer (1965a), Iland & Coombe (1988)
Tartrate/Malate	↘ & ↗	Kliewer (1965a)	↗	Kliewer (1965a)
Citric	→ or ➚	Esteban, et. al. (1999), Galet (2000)		
pH	↗	Iland & Coombe (1988), Jackson & Lombard (1993), Kennedy (2004a), Mullins, et. al. (1992), Singleton (1966), Winkler, et. al. (1974)	↗	Coombe (1975), Hamilton & Coombe (1992)
LIPIDS				
Terpeniods (in floral varieties)	↗	Coombe (1992), Jackson & Lombard (1993), Kennedy (2002), Marais & van Wyk (1986), Reynolds, et. al. (1995), Williams (?)	↘ or ↗ (terpene type & form dependent)	Gunata, et. al. (1985), Hirano, et. al. (1998)
Carotenoids	↘	Uhlig & Clingeleffer (1995)		

We know that wines made from partially desiccated grapes are more costly and risky to produce. We also know that continued production of such wine calls for a realignment of business agreements between producers and processors to fairly partition these costs and risks. What we need are measures of cost and risk that are agreeable to both parties. Compensation based on a water addition model calibrated for grape musts is one possibility.

Economically-viable production techniques that avoid or mitigate the costs and risks of extended ripening fruit are probably the best long-term solution for all parties. Such technology requires a deeper, more thorough understanding of grape growth and development than we now possess.

Soil moisture management during ripening appears to be the most promising avenue for mitigating yield loss, but what we truly need are vineyard designs and management practices that produce desirable tannins, flavors and aromas before the onset of overripening. ■

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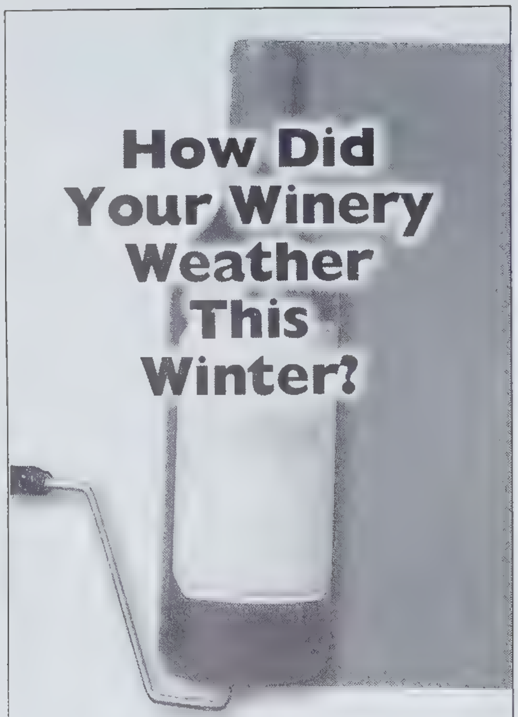
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Table III (continued)

	During Ripening		During Extended Ripening (overripeness/senescence)	
	Trend	References	Trend	References
PHENOLICS				
Total	↗	Coombe (1992), Hamilton & Coombe (1992), Keller & Hrazdina (1998), Pirie & Mullins (1977), Singleton (1966), Valero, et. al. (1989)		
Non-flavonoids				
Flavonoids				
Polymerization of skin proanthocyanidin	↗	Kennedy, et. al. (2002)		
Tannins	↘ or → (seed or skin, respectively)	Harbertson, et. al. (2002), Kennedy, et. al. (2000a), Kennedy, et. al. (2000b), Kennedy (2002), Mateus (2001), Winkler, et. al. (1974)		
Tannin softness	↗	Kennedy (2004b)	↗	Kennedy (2004b)
Flavonols	↗	Keller & Hrazdina (1998), Kennedy, et. al. (2002)	↘ (trend suggested by results)	Keller & Hrazdina (1998)
Anthocyanins (red varieties)	↗	Galet (2000), Keller & Hrazdina (1998), Kennedy (2004a), Mullins, et. al. (1992), Pirie & Mullins (1977), Webb, et. al. (1999), Westwood (1993)	↘ (maximum before shrivel)	Kennedy (2004a), Singleton & Esau (1969)
Methoxypyrazines	↘	Allen, et. al. (2000), Galet (2000), Hashizume & Samuta (1999), Kennedy (2002), Lacey, et. al. (1991), Marais (1994), Winter (2004)		
GLYCOSIDES (BOUND AROMA COMPOUNDS)	↗	GALET (2000), LOMBARD & JACKSON (1993)		
SENSORY ATTRIBUTES (grapes & wines [Noble & Shannon])	↗	Du Plessis (1975), Du Plessis (1984)	↘	Du Plessis (1975), Du Plessis (1984)
Aroma intensity	↗	Coombe (1992), Mullins, et. al. (1992), Kennedy (2002), Winkler, et. al. (1974)	→ except ethanol increased)	Coombe (1992), Noble & Shannon (1987)
Flavor intensity	↗	Coombe (2001), Coombe & McCarthy (2000), Kennedy (2002)	→ (except berry & black pepper up)	Noble & Shannon (1987)
bitterness	↗	Noble & Shannon (1987)	↗	Noble & Shannon (1987)
viscosity	→	Noble & Shannon (1987)	↗	Noble & Shannon (1987)
Wine scores	↗	Du Plessis & Van Rooyen (1982), Du Plessis (1984), Ough & Alley (1970)	↘	Du Plessis & Van Rooyen (1982), Du Plessis (1984), Ough & Alley (1970)

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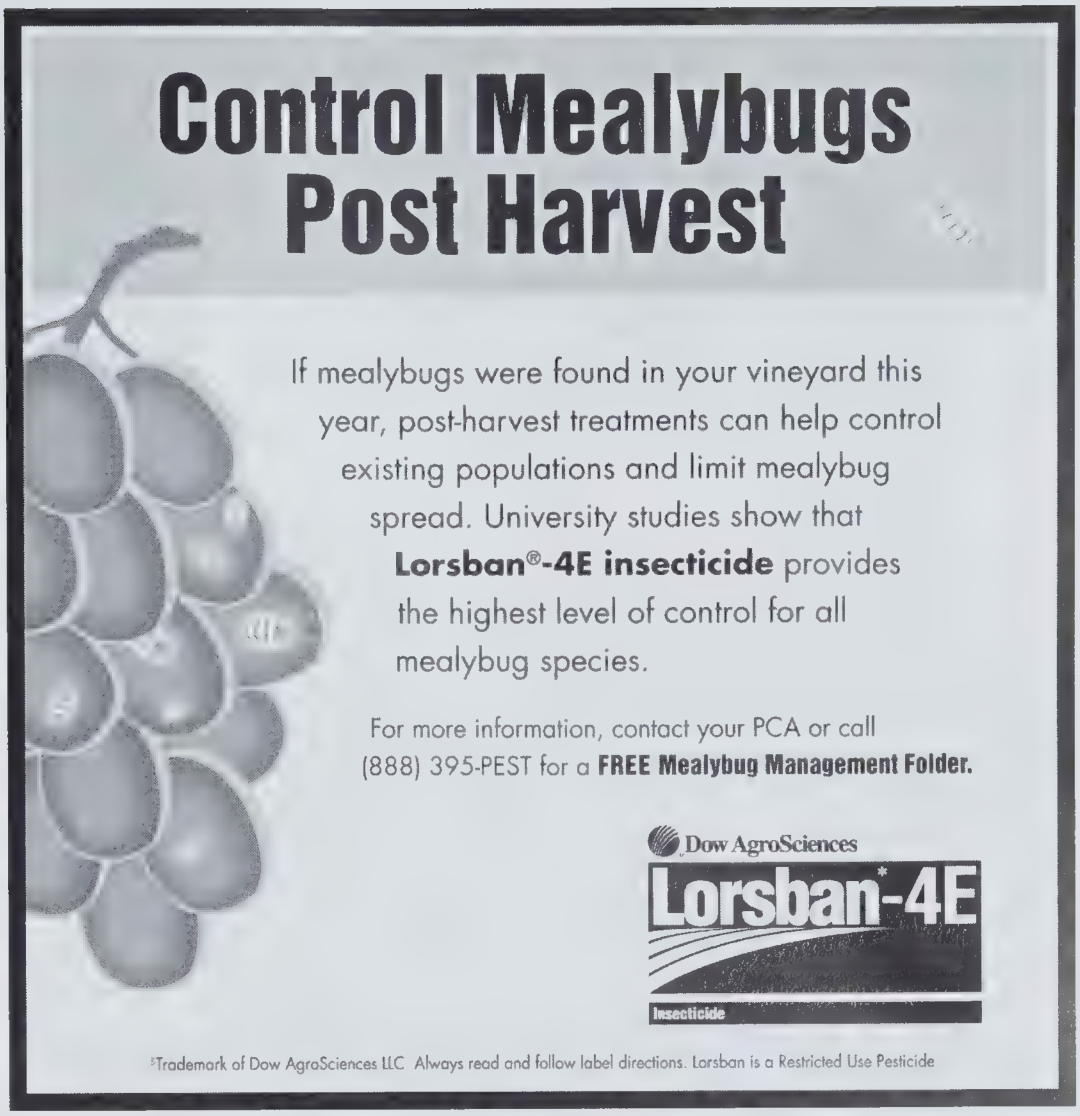

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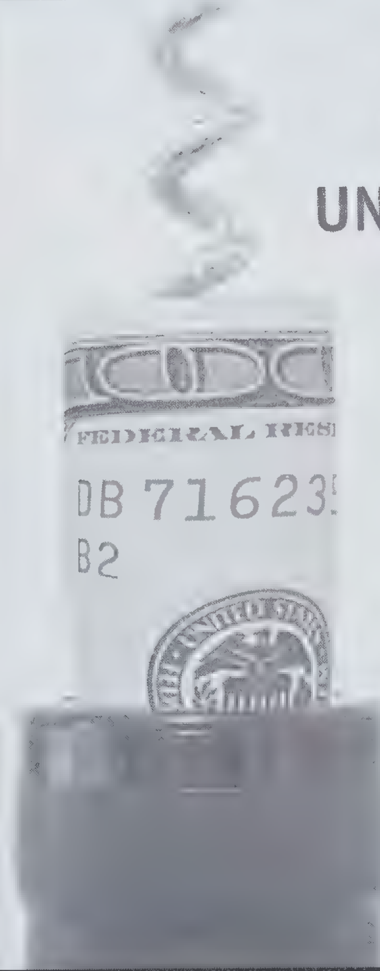

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HITTING THE TARGET

Using data tools to reach the right markets

BY Tina Vierra

Winery sales managers and staff crunch data routinely — to look at new markets or review old ones and to map sales strategies. But data is a fickle worker; it can be incorrect, misleading, incomplete, or not detailed enough for a winery's needs.

Some wineries are turning to TradePulse for help collecting, cleaning, and sorting sales data, making it much more useful. Born Reiser Reports at Southern Wine & Spirits, TradePulse became part of the Winery Exchange (Novato, CA) in 1999. It provides sales, distribution, and inventory information services grounded in a solid understanding of the reporting methods of distributors and fine tuned to the needs of wineries.

Collecting data

TradePulse's data collection efforts are focused on distributors, and the company works with over 850 wholesalers, collecting data from each using an open format system geared for that wholesaler's reporting platform.

Wholesalers report their data to TradePulse, assured that the data will be clean, complete, and accurate when it is delivered to their winery clients. TradePulse saves the wholesalers the time and hassle of direct reporting to a number of client accounts by acting as a single-source warehouse of information. Wineries benefit from information that is timely, detailed, and easy to access and use.

Cleansing data

What are clean data? Scott Diehl, VP of corporate development for TradePulse, explains, "All wholesalers are going to have some similarities in how they collect and report data, but it's the differences we have to iron out in order to deliver 'clean data.' The system uses specialized 'fuzzy logic' technology and account-matching algorithms to identify and remove duplicate retail accounts and inconsistencies."

Duplicates, overlaps, and address and naming problems in account data are flagged, captured, and moved to correct locations, all without changing the actual sales data reported. By the time the data reach the winery that purchases the reporting, they are organized and grouped in recognizable reports geared for winery use. Custom reporting is also available when a winery needs to view the data in a specific way for a particular purpose, such as introducing a new brand, managing distributor inventories of various products, or understanding retail account sales patterns.

Delivering data

A winery-customer purchases the basic TradePulse reporting system, which is modular and can be expanded

Four Cabernet Sauvignons from Stag's Leap Wine Cellars for sale at Bottle Barn (Santa Rosa, CA), an independent wine retailer.

Cline Cellars (four Zinfandels shown above) has three brands and multiple pricing tiers of varietals to place into the right markets.

to fit a winery's needs. Cost to the winery varies and can be adjusted up or down, explains Diehl, based on a number of factors, including the winery's brand portfolio, number of SKUs, number of system-users at the winery, and number of wholesalers involved. Wineries can receive straightforward sales and depletions data, retail account routines, inventory management modules, and executive summary reports.

When implementing a new customer's systems, TradePulse gathers information on the winery's fiscal year and reporting periods, units of measure, sales team territory structure, and national account focus. These parameters are incorporated into the customer's system to ensure that it provides the right information to the right person.

Winery employee(s) assigned to assist with implementation of TradePulse become experts on the system, while TradePulse becomes expert in what the winery will need in its reports. At the end of implementation, the winery's entire sales force is trained to use the reporting system to obtain what they need. Sales staff can obtain their data on-line or off-line, on-demand or on a regular schedule, as they wish.

Cline Cellars (Sonoma, CA)

Once winery sales staff have good data, how they make use of it is the most vital issue. Larry Holman is VP of sales at Cline Cellars, with three brands to manage. The super-premium primary brand, Cline Cellars, has four tiers ranging in price from $9/bottle to $30/750 ml bottle for single-vineyard wines. Oakley is a premium wine brand ($7 to $8/bottle), and Jacuzzi, launching in 2006, will be a super-premium brand, blended along the lines of Italian super-Tuscan wines.

Holman has several hundred thousand cases of wine to sell. Where are his markets?

"For Cline Cellars, the most developed markets are colder climates in the northern U.S., where customers like big reds. Outside the U.S., which is 15% of our sales now, we're becoming a global brand selling Zinfandel (Cline's signature variety) as a 'native' U.S. wine."

Sweden is Cline's strongest foreign market, followed by Canada. In Europe, with shipping costs and VAT taxes figured in, high-end Zinfandels can fetch as much as second-growth Bordeaux.

Holman and his team are selling in a roughly equal mix of chain stores and independent and chain restaurants in the U.S. He wants to further develop grocery chains, but "in the *right* way — to the right selection of chains, with the right kind of growth." That's where TradePulse comes in. He uses TradePulse data, for instance, to help determine whether a certain grocery chain in Texas is a better fit for the $10 Zin or the $25 Zin.

Holman's sales team consists of seven winery-direct regional sales managers, four regional brokers on commission, and about 80 distributors. They switched to TradePulse for the ease of using one source for cleansed data from all distributors, plus web-based access to reports and paying one flat fee for all Cline users. Holman likes being able to print a report and head straight into a meeting.

"There are several other companies who do what TradePulse does, but not in the same way," Holman explains. "I've seen systems for half the cost of TradePulse, but the work you have to do to get at the data you really want isn't worth the savings. As an industry veteran, TradePulse has the background to understand the type of data and reporting we want. That's what we paid the extra cost to obtain."

Cline gets depletion data from all markets and retail account data from about 60% of markets, which is information detailed all the way down to a particular sales rep, account, and store location for off-premise restaurant and chain sales.

"Distributors were totally cooperative when we switched to TradePulse," reports Holman. "Twenty years ago, maybe they didn't want to turn over all their data. But that was a generation ago, and they know there are no more secrets these days."

Before TradePulse, Holman would track sales by shipments going out the door. "But that just gives you an overall look at how you're doing. It didn't tell us exactly where all the wine went. Now, I can still look at that kind of summary by state or region, but then I can dig deeper, see a problem market, and dive in. I can find out that one chain is carrying a whole market and re-organize the market based on successes and failures."

Every classification of account is available to the sales team at any time. There are many ways to look at and crunch the data; any number of uses. A regional manager, working with a sales rep in a particular market, can dial all the way down to the rep's account and go into a meeting with history and current sales at his fingertips. Holman feels his team now really understands where the channels of business are for the winery.

Stag's Leap Wine Cellars (Napa, CA)

Stag's Leap Wine Cellars (SLWC) has two brands to market — Stag's Leap Wine Cellars, ranging from $20 to $150/bottle — and Hawk Crest — from $12 to $15 retail. At about 70,000 cases per year, the Stag's Leap brand is recognized worldwide and has a long-standing reputation as a high-quality wine. The SLWC sales strategy is focused on maintaining that high-quality market stance.

John Calmeyer, national sales director, has very focused ideas on where to place Stag's Leap Wine Cellars. "Primary markets for us are fine dining restaurants and independent retail shops, with chains and club stores secondary," he emphasizes. "Outside of the U.S., Asia is increasingly important to us — we're selling wine in Japan, Hong Kong, Taiwan, Korea, and China. As always, we have good standing in Europe and England, but volumes are relatively small."

The sales team manages the brand's image through quality of distribution. Chain stores and restaurant chains account for only a small percentage of the Stag's Leap Wine Cellars sales. This strategy is the opposite of the type of volume business most distributors are accustomed to delivering for wineries, and accomplishing it requires close relationships between winery and distributors.

The SLWC sales team has three regional sales managers coordinating distributors and key accounts; Calmeyer and a brand manager are based at the winery. About 70 distributors handle the SLWC brands in all 50 states with importers in 20 countries.

As at Cline, sales tracking early on at SLWC was done by measuring outgoing shipments. Prior to signing on with TradePulse reporting, the winery didn't have data beyond shipping, and gathering useful information from distributors was difficult. It was a "patchwork quilt" of data, according to Calmeyer, since each distributor's report forms, account naming protocols, and calculations were done differently.

"Then, with a goal to manage distribution of our brand at the account level, we had to get better data," he recalls. "We signed on for account-level detailed reporting for all 50 states. We look at our brands by variety, distributor, and total volume by month. We compare those to sales goals and to the two-year history of the distributor. Then, from the monthly level, we can drill down to individual accounts."

The winery is pleased at what a great fit these detailed reports are for a brand that must be micro-managed for correct placement in the market. Calmeyer also gets "Hot Accounts" — a report on growing accounts — and "Lost Accounts," which shows accounts that are losing ground. The winery is constantly updating its system with TradePulse to add new target accounts to the reports.

"Overall, we can probably sell more wine than we produce today, so we have to allocate," says Calmeyer. "We want to allocate to very specific accounts, and we have the data to back up those allocation decisions. It's *so* much better to have hard data than old anecdotal information. We can achieve effective and efficient allocation. We can build our marketing plans from the ground up."

How can the winery manage such a complex and unusual distributor relationship?

"One very big reason to use TradePulse was to guide and help our distributors with *very* focused goals we had for them," explains Calmeyer. "We offer detailed instructions on brand placement through our business reviews. With so many brands on their books, distributors need this kind of very clear and manageable direction from their winery suppliers. They are very glad to have their own sales figures, via TradePulse, to help them reach our goals. We've been able to work really well together."

Calmeyer can go into a distributor meeting with the distributor's SLWC sales data in hand that helps everyone. "I don't beat anyone over the head with it — the data's not a weapon, but a tool for both of us. If we see that sales to chains in the region are creeping up above 20%, for instance, we can use the TradePulse Channel Distribution report to help us re-plot where to place the wine in that region."

Advice from sales managers

Sales, distribution, and inventory management information systems like TradePulse can be critical tools for today's wineries. They allow large wineries to grow efficiently, with a minimum of wasted effort, and give small wineries a great tool for expanding beyond local markets.

Depending on a winery's situation, sales tracking data like this can be used in many ways. If a mid-size to large winery wants significant growth, a good data reporting system is a good analytical tool, even at the general level.

In its broadest, simplest form, a winery can gather enough data, and a matrix of better-performing distributors, to plot good growth. Wineries can look at markets and marketing investments. If there are markets showing high growth with a low investment of marketing dollars, you should mine those markets. If the reverse, you should look at why or whether your wine should be in that market.

For a small winery, sales data tracking is a great tool to expand beyond local markets. It can help you choose two or three new markets beyond your local sphere, work your way in, and analyze how you are actually doing in the new markets — not just what you are shipping there.

Data *collection* can be made simple — for a price. Data *analysis* is up to each winery's sales team — whether the team has the experience and patience to analyze and use their sales data for effective marketing is the most important factor. In the end, it's not the tools — it is the people who use the tools that will determine the winery's success in the marketplace. ■

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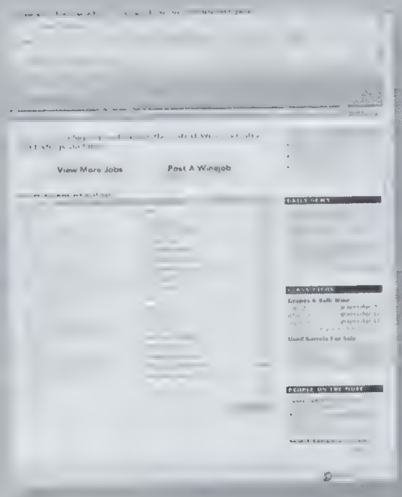

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Living with mealybugs, vine, and otherwise

One type of ant bait station under development. If the aggressive protection of mealybugs by Argentine ants can be reduced, predators and parasites will be better able to keep mealybug populations from reaching economically-damaging levels. Photo ©2005 Regents of the University of California.

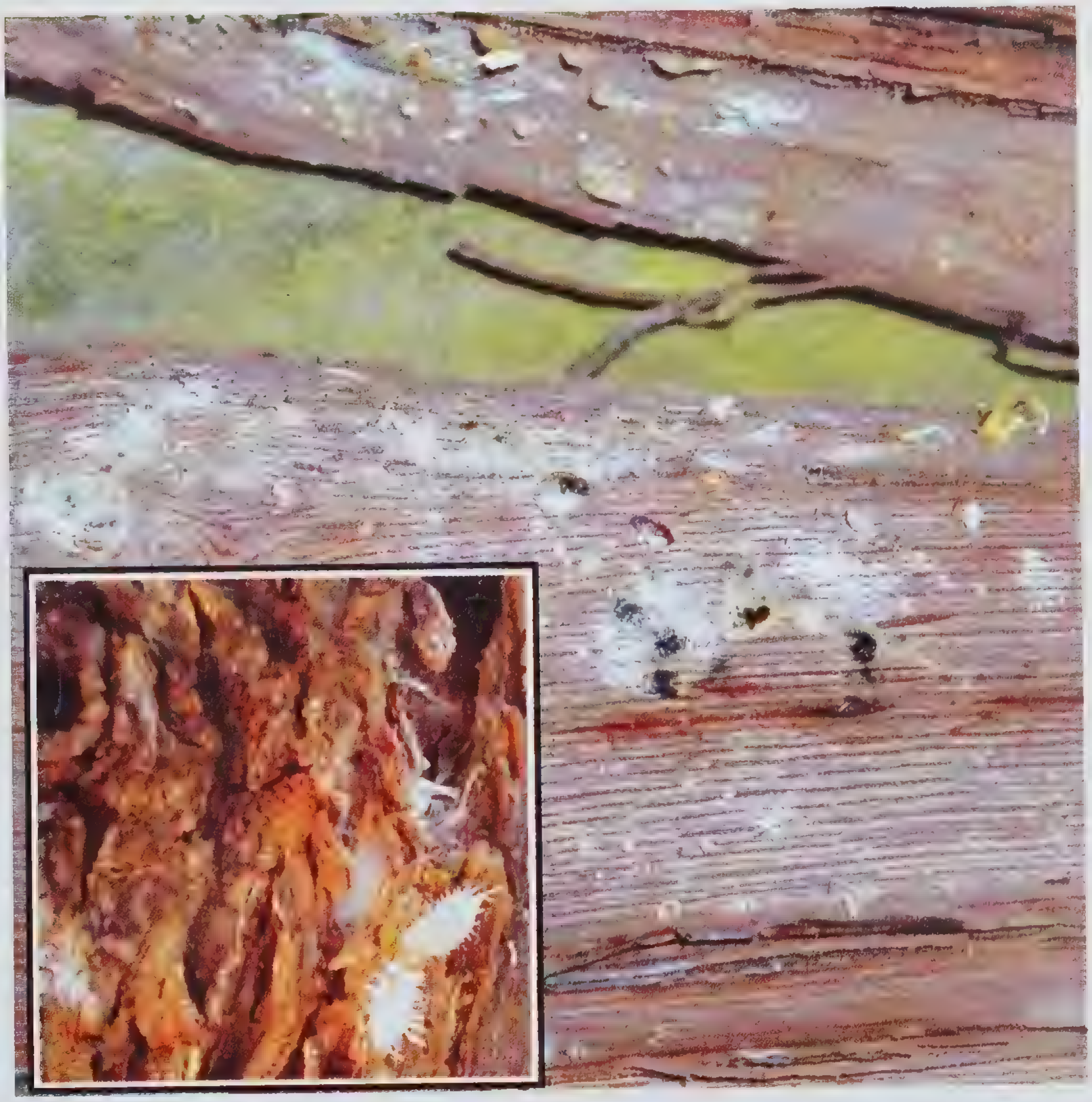
BY Laura Breyer

Growers in Napa and Sonoma Counties are approaching the fifth year of living with vine mealybugs (*Planococcus ficus* [VMB]) and are developing management programs based on University of California (UC) recommendations, modified by their own inventiveness.

Initial infestations are usually found in the late summer, and are treated very aggressively with foliar applications of Lannate (methomyl) or other broad spectrum insecticides to reduce the mealybug population and to keep them from spreading. (Lannate has a 21-day REI when applied after August 15 due to California Worker Protection Standards, not seven days as on the label.)

Bark stripping, though laborious, can also be part of this aggressive strategy. It allows better contact of the spray material on VMB residing under the bark on trunks and cordons.

Some growers have even tried removing infested vines. In the first years after VMB appeared in California, these intensive efforts were aimed at eradication. However, even though populations may be reduced to below detectable levels for a year or two, they eventually come back to unacceptable levels. It can be very difficult to ascertain if a vine has



Previous infestation of grape mealybug under bark showing mealybug wax, honeydew and some sooty mold, but no live mealybugs. Canopy and clusters were also free of mealybugs, and predatory mealybug destroyer beetle larvae were present. No ants were present. [inset]: Mealybug destroyer beetle larva (below) attacks the head of a grape mealybug (above). The mealybug has emitted a pinkish defense secretion. Left of the mealybug is a bit of the cottony wax under the bark where a mealybug colony was developing. Ants can mistake destroyer beetle larvae for mealybugs and allow this "wolf in sheep's clothes" to prowl unmolested among mealybugs. Photos by Laura Breyer mealybugs or not, due to the very small size of the crawler stages.

VMB was not the only mealybug causing trouble in 2005. Grape mealybug (*Pseudococcus maritimus* [GMB]), and the less common obscure mealybug (*P. viburni* [OMB]) populations were unusually high, obligating many growers to treat mid- to late-season for control of mealybugs already fairly well hidden in clusters. The successes here may translate to VMB management.

After mealybugs move into the clusters, foliar-applied materials often have very little benefit for mealybug control, most likely due to the difficulty of getting coverage in the clusters when mealybugs are still small enough to control easily.

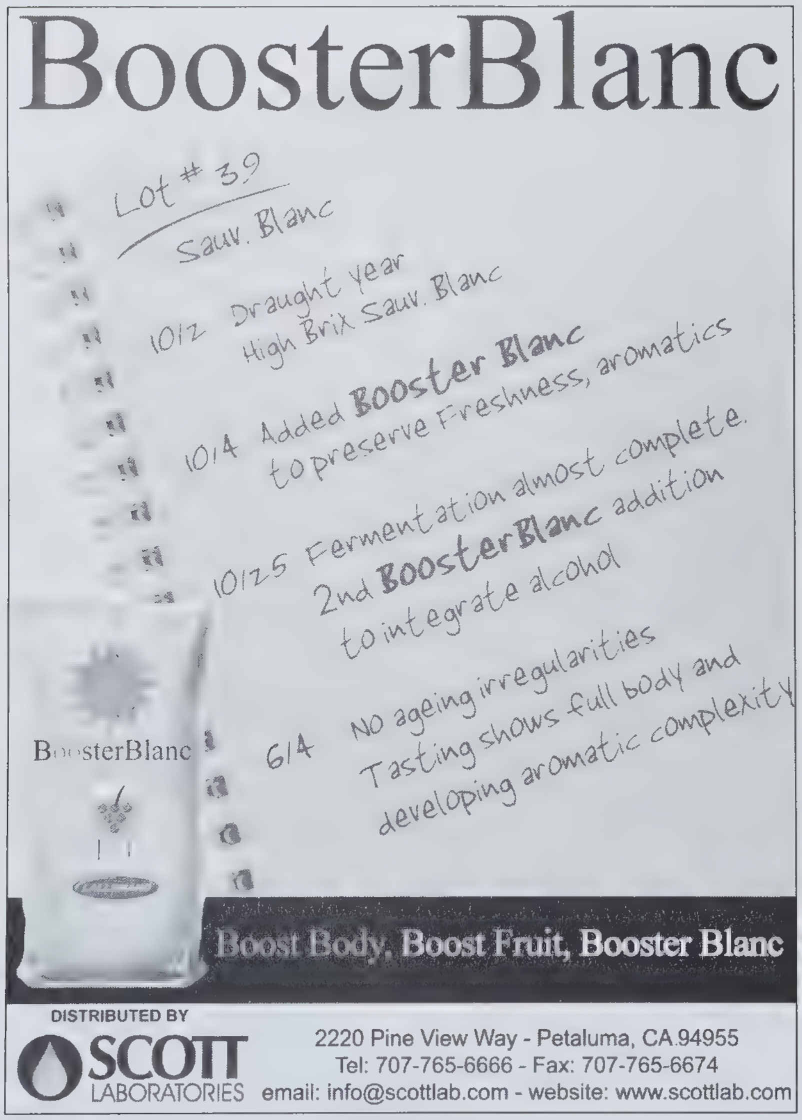
Dana Grande, viticulturist with Jordan Vineyard & Winery (Healdsburg, CA), used 8 oz of JMS Stylet-oil and 12 oz per acre of Applaud (buprofezin) in 100 gallons [water] per acre, directed at grape mealybug crawlers in grape clusters in early August. Three weeks after treating, Grande reported, "Unbelievable control … I couldn't find one mealybug in the clusters."

Don Mitchell with Purity Products (Healdsburg, CA) achieved excellent control of grape mealybug in Carneros Chardonnay clusters in late summer with dimethoate at 2 qt in 400 gallons [water] with an organosilicon spreader. Dimethoate is generally on the wane as a highly-regarded pest management tool due to its association with disrupting mite populations and potential human health risks being an organophosphate, but as an inexpensive rescue tool in mealybug management, it can play a role if utilized correctly.

For vineyards with heavy clay soils where Admire (imidacloprid) is ineffective against mealybugs, Valent has a new "Venom" neonicotinoid product (dinotefuron) that acts systemically like Admire but may perform better in heavy soils. (The cautious grower may want to test this new material on a small acreage in a mealybug-infested site before large application.)

The application method differs significantly from Admire; company representatives recommend putting Venom in towards the end of a chemigation cycle, since it moves readily and will travel past the root zone if put in at the beginning of an application, as is done with Admire. Contact your PCA or Valent representative for more specific information.

One important difference in the overall chemical management of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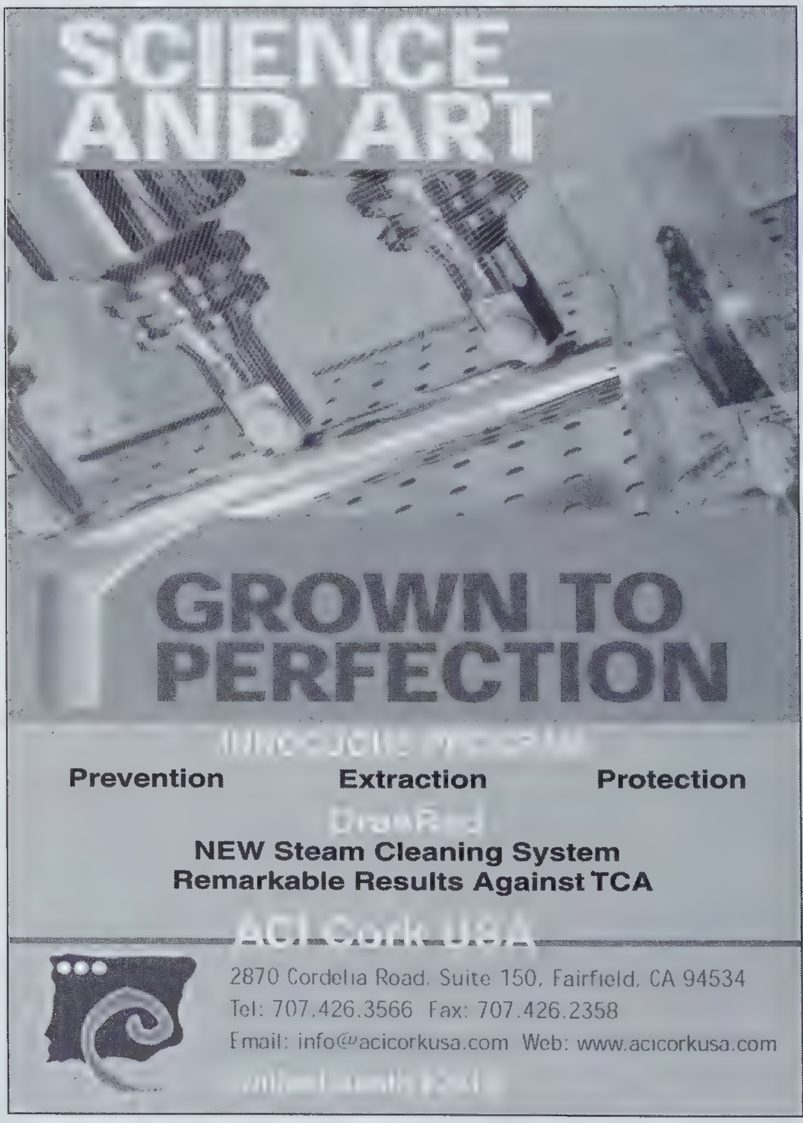
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VMB compared to GMB or OMB is that a post-harvest foliar insecticide application **is** recommended to reduce VMB populations from spreading on wind-blown leaves and returning to the trunk and cordons to over-winter.

Treating for GMB or OMB **after** harvest **is not** recommended since GMB or OMB have generally moved out of the canopy by that time. See ***PWV*** (Jan/Feb 2006) for a detailed article on the biology and identification of each mealybug species ("Which Mealybug is it, and Why Should You Care," L.Varela, *et al*).

Not only were mealybug populations elevated in 2005 in the Napa and Sonoma region, but the population of ants tending mealybugs in vines was also noticeably higher. In many older vineyards that I monitor, GMB (and less commonly OMB) is an innocuous part of the bioscape and rarely an economic pest. When monitoring mealybug nymph populations in the future, I will be more likely to trust noticeable increases in ant activity as an additional indicator of unusually elevated mealybug populations.

If there are many active ants in the vines again, I will target ants on the ground with a strip-spray Lorsban (chlorpyrifos) treatment. This is because GMB and OMB are generally under fairly good biological control in the grape canopy when the predators and parasites are undisturbed by ants or pesticides.

It is important to note that Lorsban can only be used for ant control or as a dormant vine spray for mealybug control, but not for both pests in one season. Although VMB is currently not as well-managed with bio-control in California, reducing the ant population will likely help increase predation of the mealybug population; one component in an overall management strategy.

Ant bait stations are being developed and they will be welcome additions for all mealybug integrated pest management (IPM) programs. Kent Daane and other UC researchers are working on the main culprit Argentine ant (*Linepithema humile*), studying its biology and behavior in the field so we will know when, where, and how to best deploy the stations. Bayer and other companies are working on registering effective materials. Regulatory agencies are working on approving bait stations and chemical materials for agricultural use. There may be a commercial product available in 2007.

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It is likely that there will be an organically-approved boric acid-based bait in addition to conventional bait. Daane and others are also working to establish parasites that will help reduce VMB populations to similar levels of resident mealybugs. Mating disruption with pheromone is also under investigation.

Although more foliar insecticides, insect growth regulators (IGR), and systemic chemigation materials will be used in VMB-infested vineyards than in pre-VMB days, hopefully we will also become more aware of the resident predators and use them to our advantage by developing IPM programs for VMB that effectively utilize chemical tools while conserving the beneficials.

For example, a dedicated IPM or organic grower who has mealybug destroyer beetles (*Cryptolaemus sp.*) working effectively on mealybug may not want to use the soft insecticide Applaud in the North Coast since it is an IGR and therefore prevents immature insects, including the mealybug destroyer, from developing into adults. The recommended timing of Applaud for the late spring or early summer in the North Coast coincides with the juvenile stage of the beetle, and according to UC IPM Guidelines, may compromise its populations.

Devin Carroll, past-president of the Association of Applied IPM Ecologists (AAIE), has posted a list of grape mealybug natural enemies on the AAIE website, www.aaie.net. The most important are parasitic wasps in the family Encyrtidae, and the predaceous gall midge, *Dicrodiplosis californica.* Also on the list are mealybug destroyer beetles, lacewings (Chrysopidae), some spiders, earwigs (Forficulidae), and carpet beetles (Dermestidae). Ground beetles (Carabidae) and a minute pirate bug, *Dufouriellus ater,* are also associated with mealybug colonies but have not been observed attacking them.

Many people find it remarkable that earwigs are omnivorous (feed on more than plant material), but they are well-known to grapegrowers with hand lenses as predators and have been observed eating mealybugs.

Predaceous maggots of the gall midge, and carpet beetles are also among the amazing-but-true beneficials working quietly in vineyards.

Another aspect of VMB management that I have not seen emphasized very widely is deterring birds. We are meticulous about making sure crews and equipment are clean before leav-

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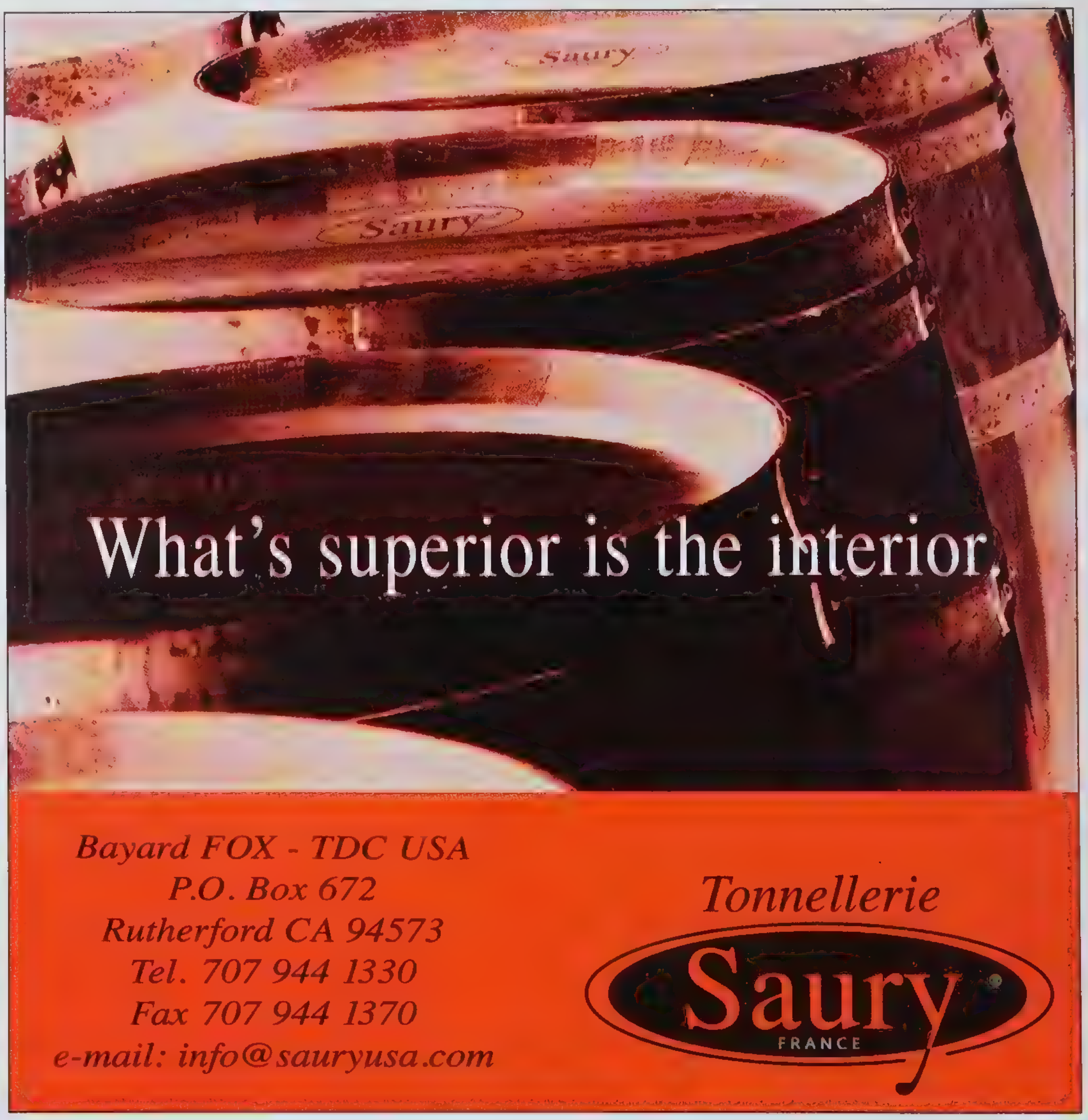

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ing a VMB-infested vineyard, but allow birds free access to feed in the infested clusters where they can become contaminated with VMB, and then move at will to neighboring blocks and vineyards, spreading the pest to new sites.

Riparian areas, large trees and roosting locations such as power lines, complicate the control of birds moving in and out of vineyards all season long, always with the potential to spread mealybugs. Such areas are good spots to monitor for initial infestations. For growers with an infestation or near an infestation, employing bird deterrents just before veraison would seem to be a prudent strategy.

The Vine Mealybug Workgroup in Napa and Sonoma Counties, along with implementing a coordinated trapping program, is working on a sniffer-dog program that will allow better detection of VMB in the field by utilizing the outstanding olfactory system of dogs rigorously trained with similar methods to those used by search and rescue or security-detection dogs.

Summary

We have been living with grape mealybug, and obscure mealybug on the North Coast of California for years. Natural predators and occasional intervention with pesticides or ant controls have limited their damage with regard to grape quality or yield.

However, vine mealybug poses a much greater threat, and while treatment practices will continue to evolve, we are developing the tools and knowledge to find, reduce damage, and limit the spread of this new important pest. ■

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Heat illness prevention, emergency medical services highlight 2006 summary of labor requirements for agricultural employers

Heat illness prevention and emergency medical service requirements are some of the changes in the 2006 *Summary of Employment Requirements for California Winegrape Growers* available from the California Association of Winegrape Growers (CAWG) in association with the Farm Employers Labor Service (FELS℠).

The 2006 guide is available on CD free to CAWG members, $25 for non-members, to allow growers to make as many copies as needed for their farming business. Printed copies are available for $25 each to CAWG members and non-members.

"As a winegrape grower in Sonoma County, I understand the importance of keeping up-to-date with current regulations," says Mike Sangiacomo, Chairman of CAWG's Member Services & Communications Committee. "We use the summary as a great reminder about important regulations and laws that help protect our employees and ourselves."

Changes in the 2006 summary include updates on heat illness prevention, truck driver hours, and emergency medical services, among other topics.

The sole focus of FELS℠ is to work with the agricultural community to help California growers understand requirements of state and federal agricultural labor laws. For several years, CAWG has worked cooperatively with FELS℠ to provide this summary and workshops to assist winegrape growers in complying with labor laws. The summary is not a comprehensive review of all laws and regulations affecting labor and employment, but designed to be a handy reference to major employment laws and regulations.

For more information about CAWG, visit www.cawg.org.

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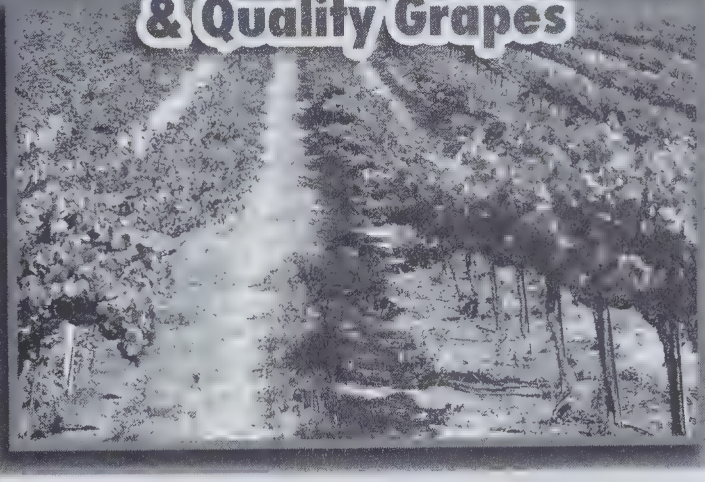

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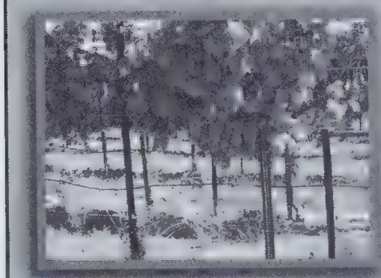

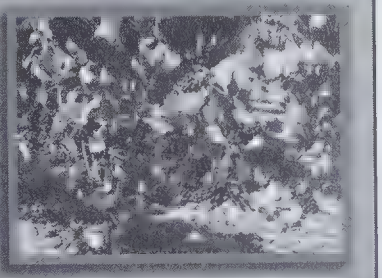

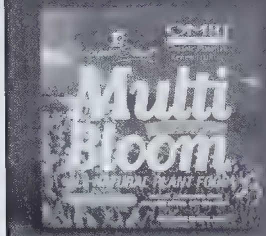

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New dynamics of wine packaging

BY Joel Quigley, Director,
Alliance for Innovative Wine Packaging

Little more than 10 years ago, wines were available in only three packaging types: cork-finished bottles for premium and super-premium wines, and screw cap jugs and bag-in-box for low-quality wines.

As a new generation of wine consumers comes of age, preconceptions about how fine wine should be packaged and when and where it will be the beverage of choice are changing, and boomers, zoomers, Generation Xers, and millenials are playing a role in generating new environments to market wine in innovative packaging.

The wine industry has entered a new marketing era — push is as critical as ever, even as there is a surge in consumer-pull at all retail and restaurant levels.

Today, consumers want convenience, quality, and value. More mobile than ever before, they want portability. Environmentally-aware of the high cost of waste and shipping, they are making eco-smart choices.

In this rapidly changing environment, it is easy to imagine a connoisseur who enjoys an elegant Cabernet Sauvignon from a cork-finished bottle, or a beautiful Chardonnay from a screw-capped bottle, or a handy single serving soft-pack at a baseball game. A candlelight dinner may call for a traditional presentation — a day at the beach for an innovative package. More and more often, context will determine the container, while the wine quality consistently improves.

King Fish is the newest Delicato Family Vineyards 1.5L bag-in-box entry.

The entire industry, from producers to the trade, is responding to this new packaging freedom. As usual in packaging of food and beverages, however, the U.S. is far behind Europe. There, wine in boxes, Tetra Paks, and PET bottles is sold alongside wine in bottles with screw caps and the traditional cork-finish, and it has been for some time. A new innovation is the soft-side pack.

According to ACNielsen, as of March 2006, sales of premium wines with screw cap closures surged more than 51% from 2005, 3.5 times faster than the total 750ml bottled wine category. The company's research reconfirmed the three-liter premium wine in a box/cask as the fastest growing premium wine category, with 70% growth for the same period.

Consumers of goods of all sorts base product choices on their own set of criteria, including packaging. Wine consumers increasingly choose by convenience, price, and ambiance.

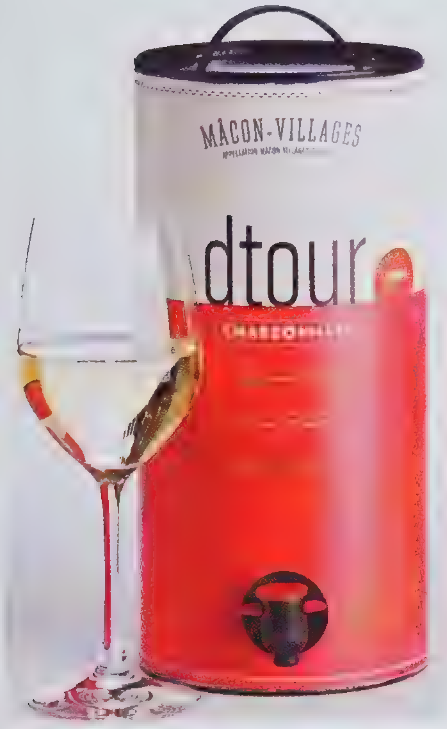
What are hot new packaging trends?

In supermarkets, sales of premium boxed wine are growing faster than any other wine segment. No longer confined to the value category, upscale box wines (over $15 per three-liter container) are making waves in the on-premise market.

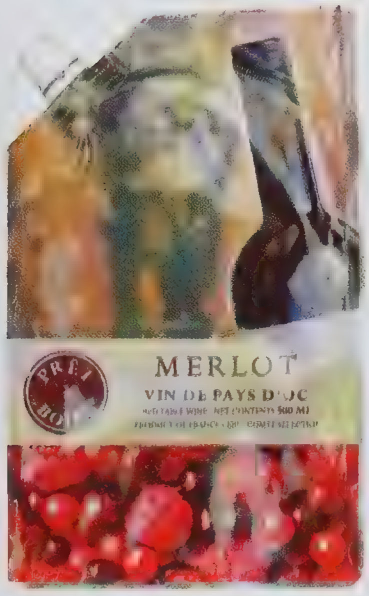
Chef Daniel Boulud, chef-owner of several elite New York City restaurants including Restaurant Daniel, with seasonal French cuisine, the French-American DB Bistro Moderne, and Café Boulud, featuring Boulud family recipes and French regional haute cuisine specialties, serves his DTOUR, 2004 Macon-Villages Chardonnay in a three-liter tubular box that retails for $36.99.

New upscale brands such as Killer Juice and Fish Eye are hitting supermarket shelves at higher price points. Set apart from competitors not so much by the box itself, but by the graphics and names designed to appeal to hipper, less reverent wine drinkers, Killer Juice features Central Coast Chardonnay and Cabernet Sauvignon at $20 per three-liter box. Fish Eye offers California Pinot Grigio or Shiraz at $16 per three-liter box.

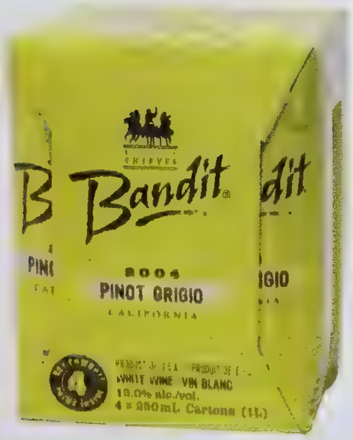
Delicato Family Vineyards has introduced the King Fish brand in a 1.5-liter box with California Chardonnay, Merlot, or Shiraz at $9.99. King Fish offers a choice of popular varieties at a lower price point than the three-liter products, giving consumers a greater incentive to try wine in conve-



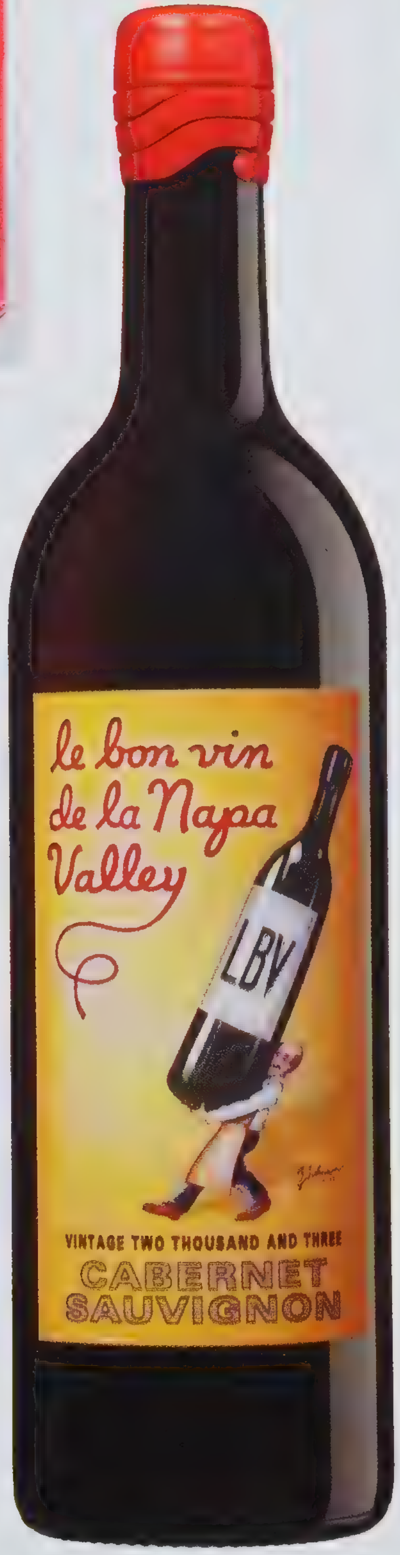
Chef Daniel Boulud's dtour wine in 3-liter tubular bag-in-box packaging.



French Merlot in a VinoPac™ soft-pack pouch.



Three Thieves Winery, "Bandit" wine in TetraPak's "TetraBrik" carton.



le bon vin de la Napa Valley (by Don Sebastiani & Sons) under the Zork closure.

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nience packaging. To give consumers complete freedom of choice, Delicato packages the same wines in 750ml glass bottles at $5.99.

These new offerings join three-liter bag-in-box packages including Delicato's Bota Box featuring California Chardonnay, Cabernet Sauvignon, Merlot, or Shiraz, all at $17.99. Other established three-liter competitors are Casara Delle Venezie Italian Pinot Grigio or Merlot ($14); and Corbett Canyon California Chardonnay, Merlot, or Pinot Grigio ($12).

The single serving 187ml market, once confined to airline wine service, is experiencing growth in broad market retail, with sales up 22% in supermarkets, drug, and liquor stores, according to ACNielsen's latest data.

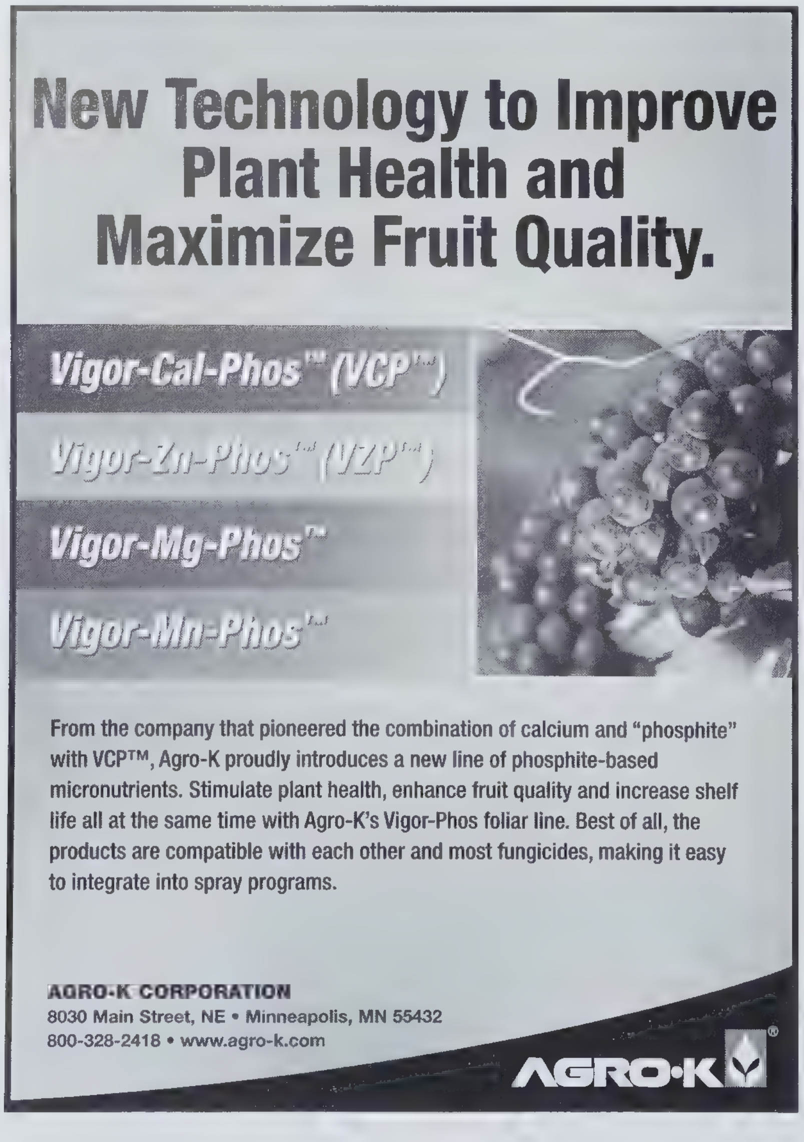
Field Manufacturing introduced the 187ml plastic bottle in the U.S. with Beringer's Stone Cellars, and brands such as Fetzer's Valley Oaks are using it to target stadiums, supermarkets, convenience stores, and airlines.

Virgin Airlines CEO Richard Branson has teamed up with Brown-Forman, to launch Virgin Vines. The brand offers California Chardonnay and Shiraz in four-packs of 187ml plastic bottles and 750ml glass bottles. Plastic bottles weigh ⅕ of their glass counterparts and answer safety concerns where glass bottles are prohibited. The wines are bottled at Fetzer Vineyards near Hopland in Mendocino County. The wines sell for $9.99 per 750ml bottle or $8.99 for the 187ml four-pack.

VinoPac™ soft-pack pouches by Ampac, an international flexible packaging producer, have crossed over from food and juice markets to wine and craft beers. Made of ultra high-tech film, the range of pouches can be crafted into standard and custom shapes, and sizes ranging from 187ml up to 1-liter. Strengthened by nylon, they can be safely packed or carried to any venue. They also accommodate various closures which can be positioned in the corner or center of the stand-up pouch, and can be printed with high-impact graphics. VinoPacs™ debuted with South African wines in 2003, and in France in 2004.

Aluminum bottles, introduced by Heineken in Europe, are in development by Exal USA specifically for the wine industry, with standard shapes, sizes, and finishes. Like PET containers, aluminum bottles are lightweight and meet public safety standards.

Heineken has had great success with aluminum bottles in upscale clubs and bars. Producers in the U.S. will likely target markets where consumers will pay a premium for a chic package. Still in development, no information



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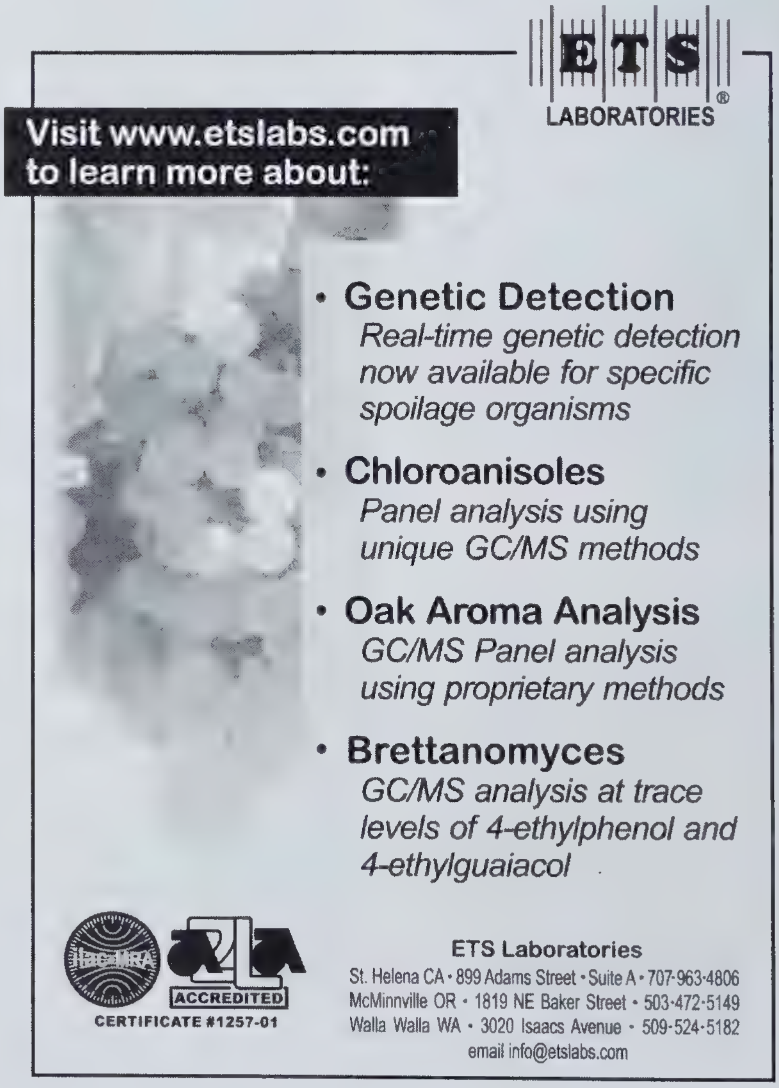

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on any cost benefits of aluminum bottles is available.

In 2005, Tetra Pak launched the first entirely domestic wine packaged in the Tetra Brik® aseptic package. Rectangular-shaped Tetra Briks stack effectively, making them a lightweight, space-saving package that is highly economical to distribute, store, and stock.

The Three Thieves brand, which first launched in one-liter screw cap jug bottles, is betting the Tetra Brik package will catch on with convenience-minded consumers. The brand is extending its offerings with introduction of its premium Bandit Cabernet Sauvignon and Bandit California Pinot Grigio in one-liter Tetra Pak Brik cartons at $7.99 and $6.99 respectively.

The number of wines with screw cap closures continues to increase. Australia and New Zealand lead the way in this category. Peter Godden (Australian Wine Research Institute, Adelaide, South Australia), estimates that about 50% of the 2006 vintage in Australia could be under screw cap, and in New Zealand that figure could be 90%.

Screw cap technology is evolving and some screw caps are now engineered to mimic cork in allowing oxygen to contact the wine in the bottle. Wine producers can choose from a range of oxygen transfer rates.

Suitable for four-color litho top- and side-printing, the "Royal 90" long flange screw cap rivals the elegance of traditional finishes. G-3 Enterprises (Modesto, CA), has installed Royal 90 equipment to become the first and only U.S.-based facility producing 30 by 60 millimeter long-skirt screw caps, compatible with European and U.S. glass standard finishes.

ENCORE is distributing, in the U.S. and Canada, the ZORK synthetic closure, currently manufactured in Australia. ZORK seals like a screw cap and pops like a cork on extraction. The ZORK can be applied to a C.E.T.I.E.-finish bottle. ZORK contains a plunger which provides a taint-free oxygen barrier without reductive character. ZORK reseals the bottle on re-application after wine service.

Don Sebastiani & Sons features a ZORK closure on four brands: Hey Mambo (Sultry Red, $14), Plungerhead (Zinfandel, $14) — le bon vin de la Napa Valley (Chardonnay, $13; Cabernet Sauvignon, $13), and Used Automobile Parts (Red Table Wine, $160 per 3-bottle box set).

In the U.S., a growing number of wineries and suppliers recognize that future avenues of growth will be paved by the industry's ability to give consumers high-quality wines in convenient containers. The Alliance for Innovative Wine Packaging (AIWP), an association of wineries, wine package suppliers, and designers was created in 2003.

The AIWP, (based in Point Richmond, CA), brings together industry members with an interest in innovation and works to increase public awareness of the growing number of packaging solutions that offer wine quality, convenience, and value. For more information, visit: www.NextInWine.com.

"The trend is clear," says Laurie Jones, spokesperson for Corbett Canyon Vineyards (San Luis Obispo, CA). "Wine drinkers are opting for convenience packaging when wine quality is high. There is confidence at the highest price levels and the growing number of brands is leading to trial, acceptance, and ultimately, preference. Consumer preference for premium wines in convenient packaging is going to continue to drive the market for the foreseeable future."

Premium three-liter boxed wines grew over 70% in dollar volume, reports Steve Morgan (vice president

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Fish Eye graphics are aimed at the young, hip market.

of marketing for Delicato Family Vineyards [Manteca, CA]), making it the fastest growing segment of the wine industry.

"This dramatic growth is driven by consumers attracted by convenience, the non-traditional format and value," states Morgan.

Delicato has became the largest U.S. winery to completely eliminate traditional cork closures on its products to eliminate 7% spoilage due to TCA in corks and capitalize on the growth in innovative wine packaging.

In April 2006, at Stony Brook University Center for Wine, Food, & Culture (Manhattan, NY), AIWP teamed with international marketing research firm ACNielsen to conduct the first comprehensive research on the overall U.S. volume contribution of a variety of non-traditional packages.

"The growth of wine sales in innovative packaging parallels that of retail sales of convenience foods," says Danny Brager, Vice President Client Service, Beverage Alcohol Team at AC Nielsen. According to industry analysts, sales of convenience foods are poised to grow at double the rate of food in general. "Of the top 25 categories we track at retail, wine's overall dollar growth was #2 at 10%, behind only bottled water," adds Brager.

Their numbers reveal that consumers are voting for innovation with their pocketbooks, enhancing the wine industry's ability to compete with other beverages and expand its consumer base through diversified packaging options. Follow-up reports in upcoming editions of ***PWV*** will look at these numbers and what they mean for the future of the wine industry. ■

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SMALL is where the growth is

BY Millie Howie

Bottling wine in single-serving 187ml bottles is not new. What is new, according to a national poll conducted by A. C. Nielsen, is the wine-drinking public's growing acceptance of not just the small bottle, but its screw-cap closure as well. The Nielsen surveys show that single-serve products are growing across all beverage classifications where small bottles represent 1.5% of the entire wine sales category.

Early in 2005, Fetzer Vineyards introduced Valley Oaks Merlot, Chardonnay, and White Zinfandel in 187ml SurShot™ multilayer injection-molded PET plastic bottles, becoming the first winery in the U.S. to implement the new technology. So successful was the April-2005 launch that, in October, the winery debuted specially designed four-packs of the single-serve Merlot, Chardonnay, and White Zinfandel.

"It's a consumer-driven first," says Lou Willsea, a Fetzer Vineyards marketing executive, noting there is a broad wholesale market composed of any venue where convenience and safety from glass breakage are paramount.

Monster Park in San Francisco, the San Diego Zoo, and the Louisville Slugger Field were among the first to offer new four-packs to fans. New Jersey Seastreak features the Ready to Go! packs aboard New York-bound ferries and Sun Country Airlines offers them on flights throughout the midwest. Club Corp. Golf & Tennis Clubs in 21 states feature the wines at 164 golf and tennis clubs while concert venues such as the Coors Amphitheatres in Colorado and the Verizon Amphitheatre in North Carolina has added them to beverage menus.

"To prepare for utilization of PET (polyethylene terephthalate) bottles," says James Sobbizadeh (bottling line manager), at Fetzer Valley Oaks (Hopland, CA), "we had to make modifications to the line and purchase new equipment. Since the bottles are shipped in bulk and are lighter than glass, we installed a New England bottle erector, which removes bottles from a bulk pack of about 1,000 bottles and sets each bottle up, separately, on the conveyor. Vacuum conveyers are utilized to hold the bottles upright as they move from the cleaner to the filler to the capper. Changes were also made to the filler spouts.

"The cap is an aluminum screw type closure- ROPP (roll on pilfer proof) from G-3 Enterprises (Modesto, CA). The cap liner and seal material is Saranex, an expanded polyethylene core covered on both sides with a three-layer film of PE and PVDC. The material in contact with the wine is PE.

"The PET bottle is a five-layer bottle, with oxygen scavengers between each layer to protect the wine. In addition to the benefits of convenience and safety, the innovative technology allows little oxygen transfer and eliminates the need for preservatives in the wine. Tests show that the wines in new 187ml bottles maintain as good a shelf life as traditional glass bottles; for a span of six to nine months for white wines and nine to 12 months for red wine."

Sobbizadeh reports that wines are bottled with 35 to 40 ppm free SO_2 and 114 ppm total SO_2.

"All of our testing shows that PET bottles offer protection against oxidation as well as glass bottles, allowing, of course, for the fact that wine in 187ml bottles does not hold as well as wine in larger formats."

The PET bottle is manufactured by Graham Packaging Company in Modesto, CA and sold by California Glass Company. Graham's proprietary ShurShot™ manufacturing process assures consistency in the barrier layers of very bottle.

The new bottles are 100% recyclable and a 24-count case of plastic bottles weighs 7.5 lbs less than comparable glass packaging. The weight saving, notes Willsea, makes the new bottles particularly attractive to airlines, looking for any weight savings that might improve fuel efficiency.

Tests show that the wines in187ml bottles maintain as good a shelf life as traditional glass bottles; for a span of six to nine months for white wines and nine to 12 months for red wine. Sobbizadeh reports that wines are bottled with 35 to 40 ppm free SO_2 and 114 ppm total SO_2.

Labels for the small bottles are identical to the standard Fetzer 750ml bottles printed in a reduced size. Carriers for the four-packs were created by Nagy Design, San Ramon, CA, and produced by Pacific Southwest Container Co.

"We worked with John Tichenor, national brand director for Fetzer Vineyards on other projects. We knew our starting point was to look

G-3 Enterprises supplied 25x19mm screw caps in stock black, stock gold (for the Sundial Chardonnay), and the custom "Valley Oaks green" color (for Fetzer Valley Oaks wines).

at what was in the marketplace and come up with a design for the carriers that would be easy to read and would convey the idea that here was something new and different," says Claudia Nagy.

"Each varietal is color-coded with an illustration depicting a setting in which the wine may be enjoyed: The Chardonnay carrier is shadow green, with a picnic scene; the White Zinfandel is mauve and the picture is of a group on the beach, and the Merlot is in shades of purple with an illustration of a couple on their deck."

Additional survey results delineate the typical consumer of single serving

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wines as between the ages of early 30s and 45, living alone or with a partner and earning over $70,000 per year. This demographic considers the small size as perfect for a number of different occasions, leading to an increase in impulse purchases. Willing to try something new and attractive, most consumers find 187s a perfect size to give them an introduction to a brand or varietal they may not be familiar with.

Point-of-sale materials include attractive shelf danglers, and specifically designed eight-case metal racks The wines are packed six four-packs to a shipper with a total weight of 12 lbs. The Chardonnay and Merlot offerings sell for $8.99 each. White Zinfandel four-packs are priced at $6.99. These recommended retail prices fit into the $7 to $10 category which is dominating growth in the single-serve market. Chardonnay continues to be the leading varietal with consistent double-digit sales growth. The three varietals selected by Fetzer for the program account for 75% of the total sales volume in the 187ml area.

Fetzer Valley Oaks Ready to Go! four-packs are now featured at Super Target Stores in Alabama, Arizona, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Missouri, Nebraska, North Carolina, Texas, and Wisconsin. ■

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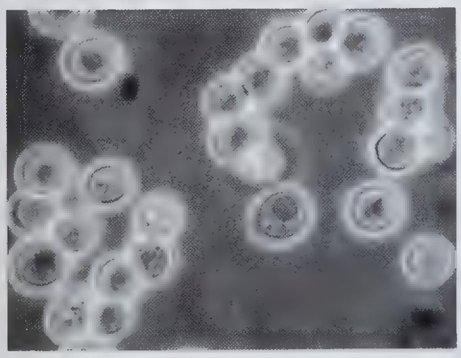
By Dr. Charles G. Edwards



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Improved bottling productivity

BY Don Neel

St Supery (Rutherford, CA) has installed a new bottling line operating at 165 bottles per minute (bpm), allowing more gentle filling of the wine through state-of-the-art filling valves. Gary Leggitt, St Supery bottling/production manager, reports a reduction in oxygen pick-up from 0.3 ppm on the prior bottling line to under .05 ppm today.

The new bottling line has a maximum operating speed of 180 bpm, an increase over the previous equipment (17 years old) at 100 bpm. "With this increased productivity, we are able to expand our custom bottling clients," notes Leggitt.

Line automation and machine synchronization have reduced changeover time between bottle sizes (375ml, 750ml, 1.5L), and bottle shapes (Bordeaux or Burgundy standards, various finishes, tapered, and various diameters).

"There is future potential for increased automation which would reduce manpower requirements," says Leggitt.

The equipment provides 100% quality assurance from three separate inspection systems:

There is a Bertolaso LOGILEVEL fill height (rejection of 1.5 mm fill-height variation) and closure-presence detector that works in conjunction with a Bertolaso LOGIPUSH bottle ejection system on the conveyor after the corker.

An inspection system (integrated in the Robino & Galandrino capsule applicator/spinner) scans for presence of cork and capsule. If there is no cork, the machine will not place a foil on the bottle and will sound an alarm. If there is no capsule, the machine will sound an alarm. If it has three faults in a row, it will sound an alarm, stop the machine, and a message will appear on a touch-pad screen letting the operator know what the fault is.

A CIVision three-camera LOMAX P vision inspection system (integrated with the labeler) is responsible to provide 100% verification of bottle quality, including label and capsule (presence, placement, and quality).

First stop for the bottles is the Bertolaso Unibloc Sicronia 28/45/9 monobloc (see cover photo) that contains three modular machines (mechanically synchro-linked). The Calipso 28-valve

Photos by John McJunkin

Bertolaso rotary bottle cleaner with adjustable starwheel to accommodate all 750ml bottle shapes.

Bertolaso low vacuum/gravity filler with Epica valves (bottle-centering cone, auto-fill adjustment), and quick valve removal system.

Bertolaso Epica filler with easy-to-clean heavy-duty pneumatic bottle pedestal design.

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Bertolaso rotary corker has no-tool cork jaws, improved cork transfer system, vacuum dust removal, and provides vacuum/gas/vacuum in head space of bottles.

Bertolaso floor-level bulk mechanical cork feeder has optional cork-orientor for single-disc corks. Cork bin holds about 8,000 corks.

Bottle rejection system [after corker] will discharge any bottles that do not meet predetermined specifications for fill height and closure depth. On the wall behind the bottle conveyor is the Allen-Bradley PanelView 1000 touch screen, mounted on a stainless steel automation cabinet, that controls all line automation functions, including synchronization of the bottle conveyor with speed of machines and bottle accumulation. The PanelView 1000 touch screen display enables one-touch adjustment of machines in the monobloc for bottle height, fill level, and closure-insertion depth of each bottle.

bottle blower/cleaner has 90mm penetrating nozzles that blow bottles with 4X bottle volume of nitrogen.

Filling valves on the Epica 45-valve low-vacuum filler are 316-stainless steel and the filler bowl and associated components are 304-stainless steel. There is automatic fill regulation that is sensored to wine temperature (55°F in winter). An inert nitrogen blanket system protects wine in the filler bowl.

"Sanitation for the filler includes a closed circuit clean-in-place (CIP) system with auto valve opening, countercurrent cleaning action and CIP caps on each valve," explains Leggitt. "Sanitation includes 180°F water in the system for 30 minutes then drained at the beginning of the day. When the temperature of the filler bowl returns to ambient, wine enters the system.

"At the end of the day, wine is drained, there is a cold water rinse followed by hot water to achieve 180°F temperature in the valves for one hour, and that water remains in the system over night. When changing from red to white wine, there is an idofor-rinse and citric rinse at ambient temperature." Replacement of O-rings in the filler valves is recommended every 1,000 hours.

On the Delta 609 corker (nine corking heads), a vacuum shoe removes any dust particles on the cork before insertion. To remove oxygen from the head space, a vacuum is pulled on each bottle, followed by a nitrogen gas-sparge and another vacuum. The cork is partially inserted before the last vacuum to maintain the head space environment.

"The bottle-centering devices are removed and cleaned every morning," adds Leggitt. "Four or five sets of cork jaws are removed and cleaned every morning. The only adjustment to run synthetic closures for white wine, instead of natural corks for red wine, is to change the stroke-depth of the plunger on each head, which can be done automatically. All nine heads can be adjusted simultaneously from the control panel."

The monobloc has an auto lubrication system that maintains proper lubrication for key machine components including the main gears and bottle pedestals.

A Bertolaso ALX-10 cork feeder delivers 260 closures per minute with an elevator and single chute from a floor-level hopper with a compressed air and vacuum dust-removal system.

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The new Robino & Galandrino Z Astra-12-pedestal monobloc foil capsule dispenser and spinner has a feeder capacity of approximately 8,000 capsules, and can spin-down capsules on 12 bottles at one time after capsule application.

R&G Z Astra capsuling machine has dispensing cups moving in an elliptical motion that increases the time each cup is in front of the capsule stick and over the bottle, insuring efficient capsule dispensing and application.

A CIVision 3-camera LOMAX P vision inspection system has been integrated into the PE Labeler. Any bottle with a defective label, capsule, or incorrect fill-level will be detected, tracked, and rejected by the vision system.

The Bertolaso bottle conveyor (118 meters long) has an Allen Bradley automation control system with eight drive motors and eleven inverters. Between the monobloc and capsule applicator/spinner, there is a three-bottle lane capacity to accumulate up to 500 bottles (equivalent to a three-minute dwell time for bottle backup), to allow continuous operation of the monobloc filler/corker while allowing change of label-rolls on the labeler.

All operations in the Robino & Galandrino (R&G) Z Astra monobloc with capsule dispenser turret, capsule spinning turret, and long range capsule feeder, are controlled by a PLC that guarantees precision timing at high speeds. R&G spinning heads have six independent spring-loaded rollers, a centralized mechanical system (ring nut) for pressure-adjustment of the spinning rollers, a wide diameter spring with ring nut for pressure-adjustment of the bottle pad, and electronic synchronization of the spinning head speed with machine speed. This sychronization is achieved by constant information exchange between the inverter controlling the machine-drive and the inverter controlling the spinning heads drive.

The two-station PE Labeler (installed in 2003) applies pressure-sensitive front and back labels and is prearranged for a third station to apply a full-wrap neck label. The labeler has 12

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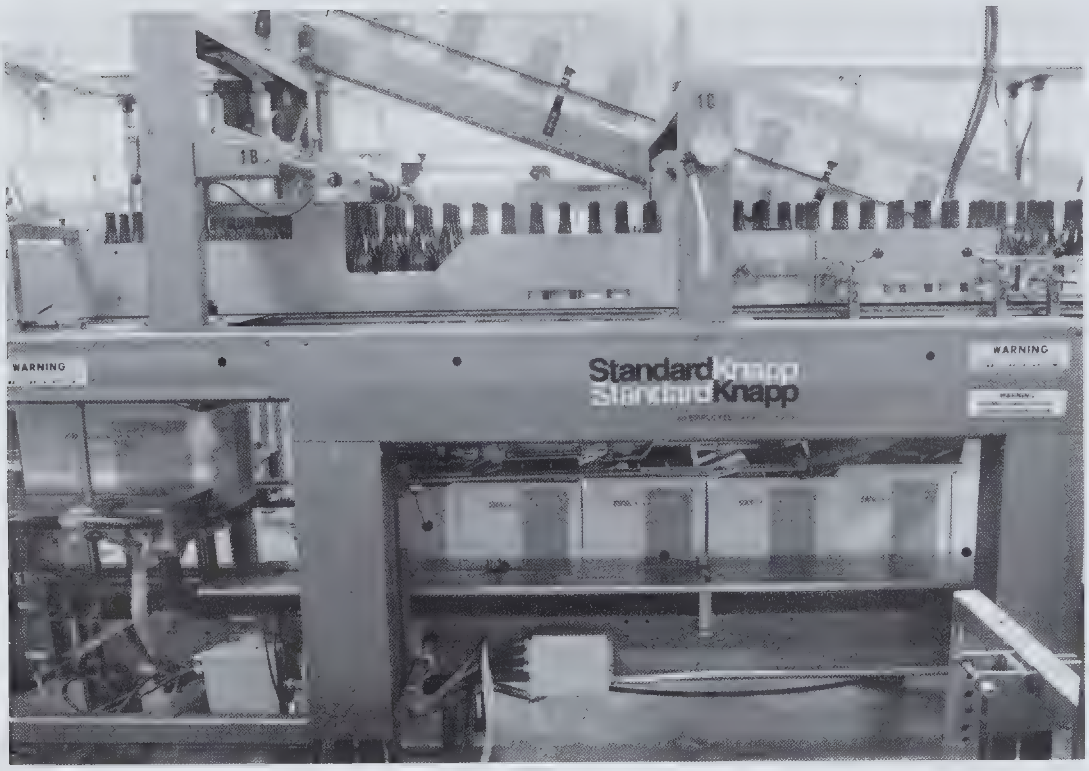
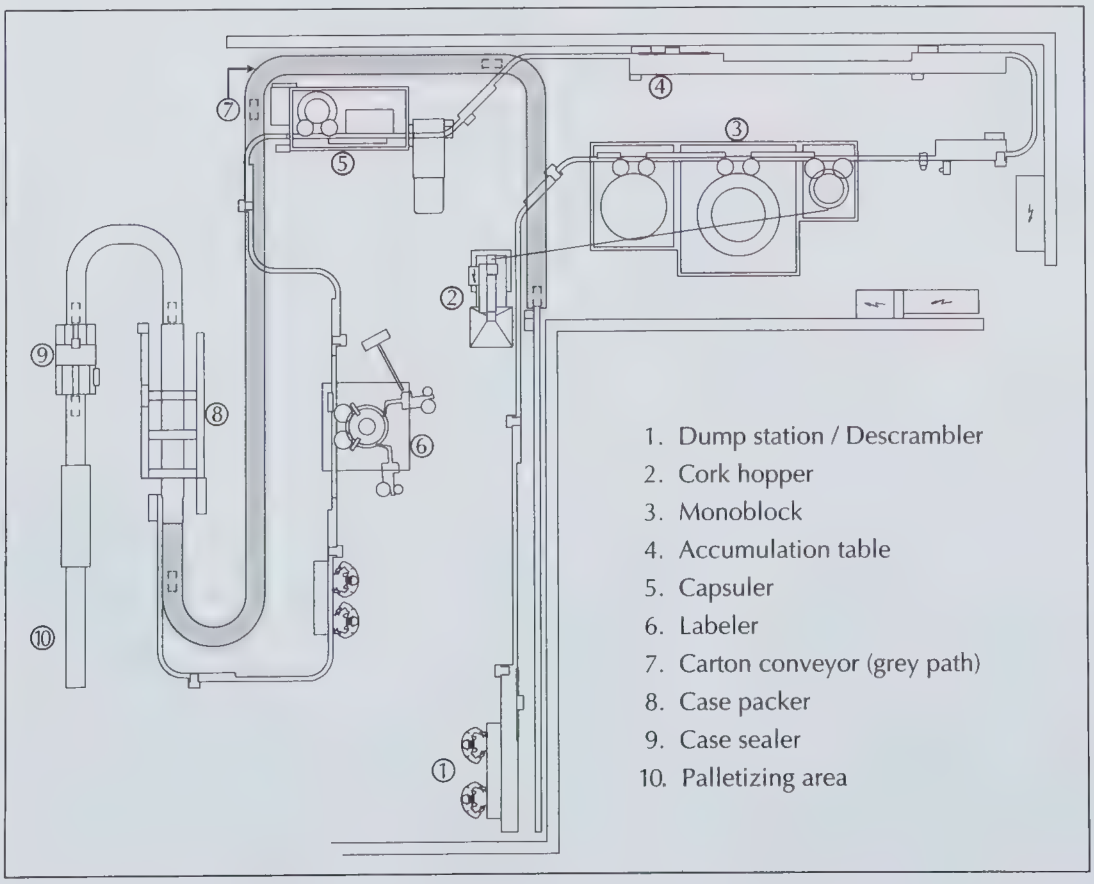


The Standard-Knapp case packer protects the label, closure, and bottle integrity throughout the packing cycle at speeds up to 30 cases per minute.

The Squid Ink ink-jet printing system applies high resolution (185 lpi) coding directly on the case.

bottle pedestals and can run up to 180 bpm. Each labeling station has a 300-mm reel-holder with capacity for approximately 4,600 labels, 75 mm long. Adjustments of label placement on five-way axis (height, radial, tangential, radial-inclined, tangential-inclined), and height of electric turret, can be made on a control panel (on a 180° rotating arm for easy access), containing an Allen Bradley SLC 5-04 processor with a Panel View 600 touch screen.



Bottling line schematic includes a 27-meter long carton conveyor with motorized rollers that moves cartons from the dump station/descrambler to the Standard-Knapp case packer.

"Installation of a Standard-Knapp case packer has reduced scuffing on bottle labels by going from hand-packing to machine-packing," reports Leggitt. "The snap-in grid and quick-change lane spacers allow the operator to quickly change for bottle sizes with complete confidence."

A Belcor 270 automatic case sealer folds down all flaps of the carton and seals with hot melt glue, operating at 28 cases per minute.

"The Squid Ink ink-jet printing system is a low-maintenance device, easy to use, and simple to program the case coding," adds Leggitt. The cost per ink-jet-printed case is approximately 1/10 the cost of labels (material only, in addition to labor or an automated process to apply the labels). ■

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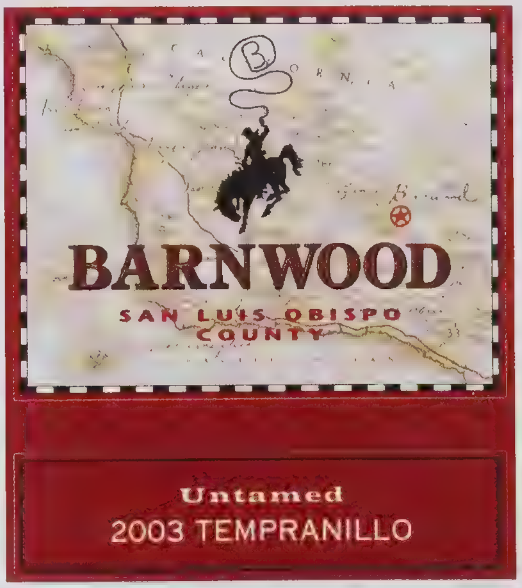
BARNWOOD
lassoes western look

BY Millie Howie

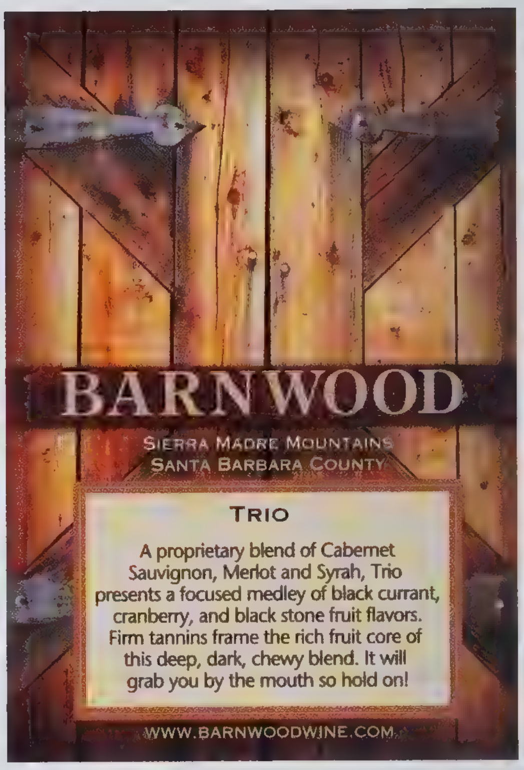
When a winery decides to embark on the serious work of redesigning its label, it isn't a simple task. Take, for example, the move by Selim Zilkha — owner of the Central Coast wine brands, Laetitia, Barnwood, and Avila — to replace a trio of pleasant but undistinguished Barnwood labels with a distinctive new look that defines the vineyard's sense of place quite literally.

A stand-alone brand, supported by estate vineyards in the remote Sierra Madre Mountains along the eastern boundary of Santa Barbara County, Barnwood was established in 1982. Zilkha, a successful entrepreneur from southern California, purchased the Barnwood property in 1998. He was joined in his venture by his daughter Nadia Zilkha Wellisz. Over the next three years, the family expanded the Barnwood vineyards to 750 bearing acres and planted a diverse selection of Bordeaux and Rhône varietals with various rootstocks and clones.

Eric Hickey, winemaker and general manager of Barnwood's vineyard properties, says his approach to winemaking is minimalist, following the traditional Bordeaux style, using more maceration and pump-overs for maximum extraction of flavor. Barnwood's red wine barrel regimen is comprised of 90% Radoux French and 10% American oak from the Missouri Ozarks, with over 40% new barrels added each year.



New label features a rustic, antique map.



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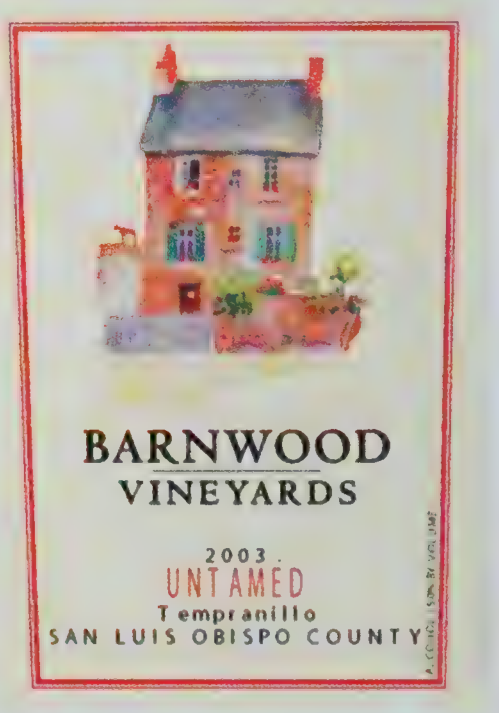
"I believe there is a strong link between vineyard and winery and feel that our vineyards' expression is very distinct," Hickey states. "Our role is to maximize that expression with skillful



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winemaking without compromising the special character of the vineyard."

Four core Barnwood wines, Cabernet Sauvignon, Petite Sirah, Sauvignon Blanc, and Tempranillo, have a suggested retail price ranging from $14 for Sauvignon Blanc to $22 for Cabernet Sauvignon and other reds. Prior to the decision to make a label change, each wine had its own separate label design with little common thread to identify them.

Three separate labels were used on the first Barnwood wines. Cabernet Sauvignon appeared with a label bearing a pastel rendition of an old French-inspired farmhouse on the property. The Sauvignon Blanc had a white stylized label with the farmhouse appearing in gold foil, while the Trio (a blend of Syrah, Cabernet Sauvignon and Merlot) bore a label with a black and white illustration of the farm house with red accents.

After a May 2005 decision to change the label to reinforce the identity of Barnwood as a "family" of wines and place emphasis on the unique high-elevation vineyard sites, the first move was to create proprietary names to describe the wines more accurately and innovatively. To further emphasize the terroir, each name reflects one of the singular aspects of the vineyards.

Barnwood's Sauvignon Blanc became "The Border," saluting the vineyard location at the corner of four California counties: Kern, Santa Barbara, San Luis Obispo, and Ventura. Defining the elevation of the mountainsides where its grapes flourish, the Cabernet Sauvignon became "3200." The exciting brightness of Barnwood's Tempranillo dictated its appropriate name — "Untamed," — and the Petite Sirah called "Long Shadow" reflects the climatic conditions affecting it.

With the descriptive names in place, six artists were invited to submit concepts and bids. From among them, Bob Johnson (Santa Rosa, CA) was chosen. Debra Morris, director of marketing and public relations for Barnwood wines, invited him to meet with her and her associates to discuss the project.

"That first meeting was very important to me," Johnson explains, "since I need to find out as much as I can about how a client is viewing the assignment, so that I do not veer off in the wrong direction. I love designing packaging more than any other facet of my art. I was familiar with the winery, and I know the countryside around Santa Barbara where the Barnwood vineyards are located, since I am a native of Southern California and drive through that region frequently.

"In my meetings with the label team at Barnwood I was amazed by how open they all were to my ideas and how great they were to work with. They asked me to present some samples of how I would approach translating the image of the wines to a label.

"I have an art library of about 500 books, so I pulled out all my books and immersed myself in western images. I got so excited that I ended up presenting the group with 10 labels, which we narrowed down to three, then I took elements from each to produce the finished art. From my original designs, we retained the map, the bronco, and lasso as key elements."

Johnson's imagery was inspired by the rugged high altitude location of the vineyards in the Sierra Madre Mountain Range. The vineyards' sense of place is literally and handsomely defined by the label's background — a map of the Santa Barbara area delineated in a rustic antique cartographic style with a modern road map border.

A strong, western logo font reinforces the message that these are wines of strength, vigor, and serious quality. The centerpiece of the art depicts a cowboy astride a bucking bronco. The lariat spinning over his head twists into a stylized B that is repeated as a cattle brand on the bottle's capsule.

"I work in pen and ink and colored pencils and with Adobe Photoshop software," says Johnson. "All the design and illustration was done by hand, not digitized. After the main art was set, it was given to Linda Palo of Design Solutions in Santa Rosa, who scanned the art and did the gradients. We worked as a team, and I feel we created a nice image."

Debra Morris has been encouraged by the excitement the new package has generated. "I think in choosing the bucking bronco image as a logo to illustrate the vineyard's untamed location, we really hit on an icon that is close to many people's hearts. The cowboy is such a symbol of American independence that it resonates with people from all walks of life.

"We are seeing a renewed interest and commitment to the brand from our distributors, and in market-visits with the trade almost everyone has seen the new package as a step up in quality and has been receptive to our message.

"Consumer response we see in our tasting room has been fantastic. People love the cowboy icon and are intrigued by the map. They are buying a lot of the Barnwood logo merchandise in addition to wine, which tells us they are really connecting with the brand.

"Our advertising, which continues to emphasize the dual theme of high altitude and western style, has resulted in many phone calls from all over the U.S. asking where Barnwood wines can be purchased."

The total redesign includes front and back labels, typeface, new art, foil, press kits, case cards, and several photographic beauty shots. Steve Miller of SE Miller photography (San Luis Obispo) took the western-inspired photos, which Colleen Cass of Design Solutions (Arroyo Grande, CA), used to prepare the designs for shelf talkers, a menu card, and a series of consumer-focused advertisements, which are scheduled to appear in the Southwest Airlines in-flight magazine, *Cowboys & Indians*, and *Wine Enthusiast*. Cass also produced the designs for the new Barnwood press kits, sell sheet, and case art.

"What we have sought to achieve in all the components of the label change," says Cass, "has been an artistic impression of the rugged Sierra Madre Mountains, where the vineyards are located. We developed several variations on the rough-textured wood and iron hinges of an old barn door for the shelf talkers in order to maintain the rustic look of the label without creating an absolute reproduction."

The labels were printed by WS Printing in San Luis Obispo. Ryan Mahoney, sales representative, notes that everyone in the plant and on the winery side were pleased with how the labels turned out. His company is particularly happy to have made a suggestion that, helped achieve the effect the winery desired: "the metallic ink that was used should be hit with a gloss varnish. This preserved the rich look of the art while saving Barnwood some money."

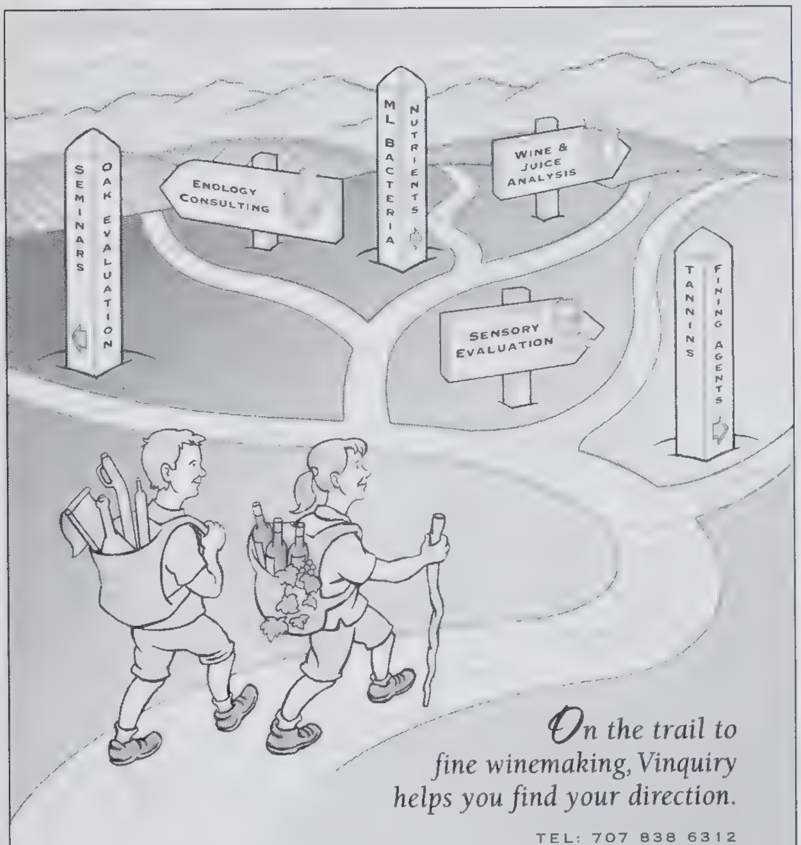
Mike Mazzocco, general manager of Packaging Innovators Corp., which produced the shipping carton, is impressed with how the standard 12-bottle cartons became highly identifiable, even from a distance, thanks to the cowboy and bronco silhouette printed on two sides of the carton and the map on the other two. In Mazzocco's opinion, the fact that the carton was printed on Kraft paper gives it a greater appearance of old barn wood to reinforce the rustic western look.

The current closure for all Barnwood red wines is natural cork from Cork Supply USA. The winery plans to switch to a synthetic closure on the 2006 Sauvignon Blanc. From the first discussions of the proposed label change to the introduction of the first vintages to wear the new look, in February, 2006, was a surprisingly short nine months.

"I think the new packaging for the core tier of Barnwood wines, coupled with our sales and marketing efforts, is a big step forward toward creating awareness for the high quality of the Barnwood wines," concludes Morris.

"Now our concentration is to bring this same quality to the packaging for Barnwood Trio and the new tier of Reserve level Cabernet Sauvignon we will introduce this summer. We are nearing completion of the various design elements and look forward to debuting this new addition in the market.

"We are also in the process of creating a petition for a Sierra Madre Mountain AVA for the Barnwood Vineyards wines. There is a lot going on with the brand!" ■



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Bacterial nutrition—

Key to successful malolactic fermentation

BY Didier Théodore, Lallemand S.A.,
Sibylle Krieger, Lallemand S.A.,
Ann Dumont, Lallemand,
Peter Costello, Lallemand Australia

Malolactic fermentation (MLF), the conversion of L-malic acid to L-lactic acid and CO_2, is a very important secondary fermentation carried out by lactic acid bacteria, typically *Oenococcus oeni*, during vinification of most red wines and certain white wine styles.

In addition to de-acidification, other significant impacts of MLF include influencing organoleptic characteristics of wine and conferring a degree of biological stability towards further degradation of L-malic acid.

Of the different factors that influence development of lactic acid bacteria in wine, the physico-chemical properties of wine (pH, concentrations of alcohol and SO_2, and temperature) are foremost in determining how well the malolactic bacteria will thrive and subsequently carry out MLF.[1,2,4] Additionally, the ability of malolactic bacteria to grow and conduct MLF is highly dependent upon the nutritional status of the must/wine.

The availability of certain nutritional components required by malolactic bacteria can have a significant impact on the successful completion of MLF and also avoidance of stuck or sluggish MLF. In view of the importance of the nutritional requirements of malolactic bacteria in conducting MLF, this article provides a short review of:

- The wine environment and how it influences bacterial growth and metabolism,
- Latest research on bacteria nutrition.

Effect of wine/must composition on the ability of Oenococcus oeni to grow and conduct MLF

The physico-chemical properties of wine, including temperature, pH, concentrations of SO_2 and alcohol, are primary critical factors governing development of malolactic bacteria and can often be difficult for *O. oeni* (Table I). Moreover, the inhibitory impact of two or more harsh physico-chemical conditions in combination can be additive. Other compositional factors such as polyphenols and pesticide residues from vineyards also play a role in development of lactic acid bacteria.

Another vital factor governing the ability of malolactic bacteria to grow and conduct MLF (which is often overlooked), is the availability of nutrients that are essential for bacterial growth. All microorganisms have specific nutritional requirements in order to carry out regular functions of growth and metabolism. *Oenococus oeni*, the major species of lactic acid bacteria associated with MLF, is nutritionally fastidious and requires a diverse range of nutrients to sustain its growth and development.

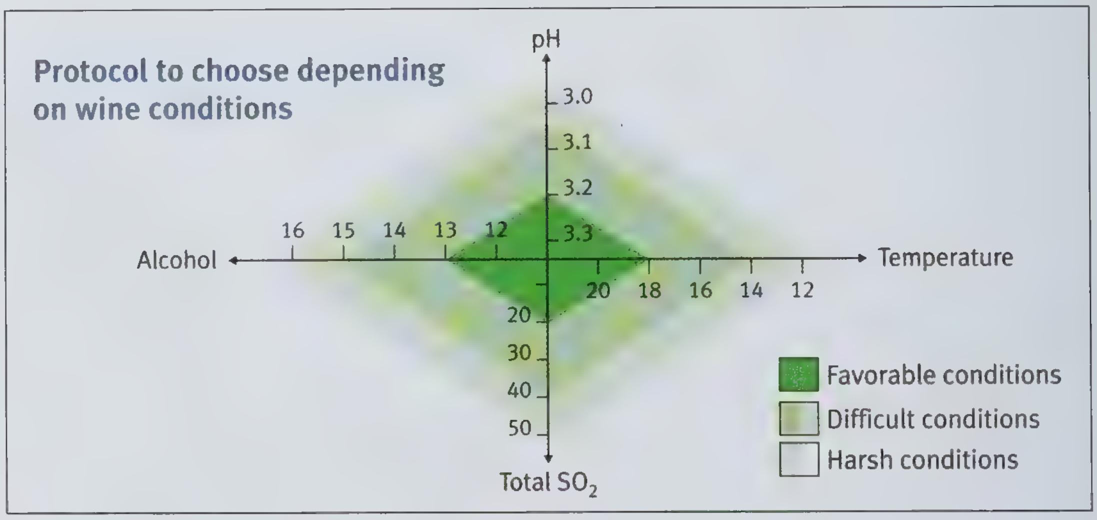

Figure I. Factors affecting relative ease of malolactic fermentation: Interrelated effects of four parameters upon ease (or difficulty) of MLF. It is important to consider these factors when deciding on timing of bacteria addition, the strain of MLB to use, and the type of culture (build-up or direct inoculum) to use. Understanding the effect of the total environment on the bacteria, will promote informed decisions with regard to these variables.

Table I. General characterization of wine conditions for malolactic fermentation

Wine conditions	Favorable	Difficult	Harsh	Extreme
pH	> 3.4	3.1 to 3.4	2.9to 3.1	< 2.9
Total SO_2 (mg/L)	< 30	30 to 40	40 to 60	> 60 to 80
Free SO_2 (measurable)*	< 8	8 to 12	12 to 20	> 20
Temperature (°C)	18 to 22	14 to 18	10 to 14	< 10
Alcohol (% v/v)	< 13	13 to 15	15 to 17	> 17

*as measured by aspiration method (Iland et al, 2000)

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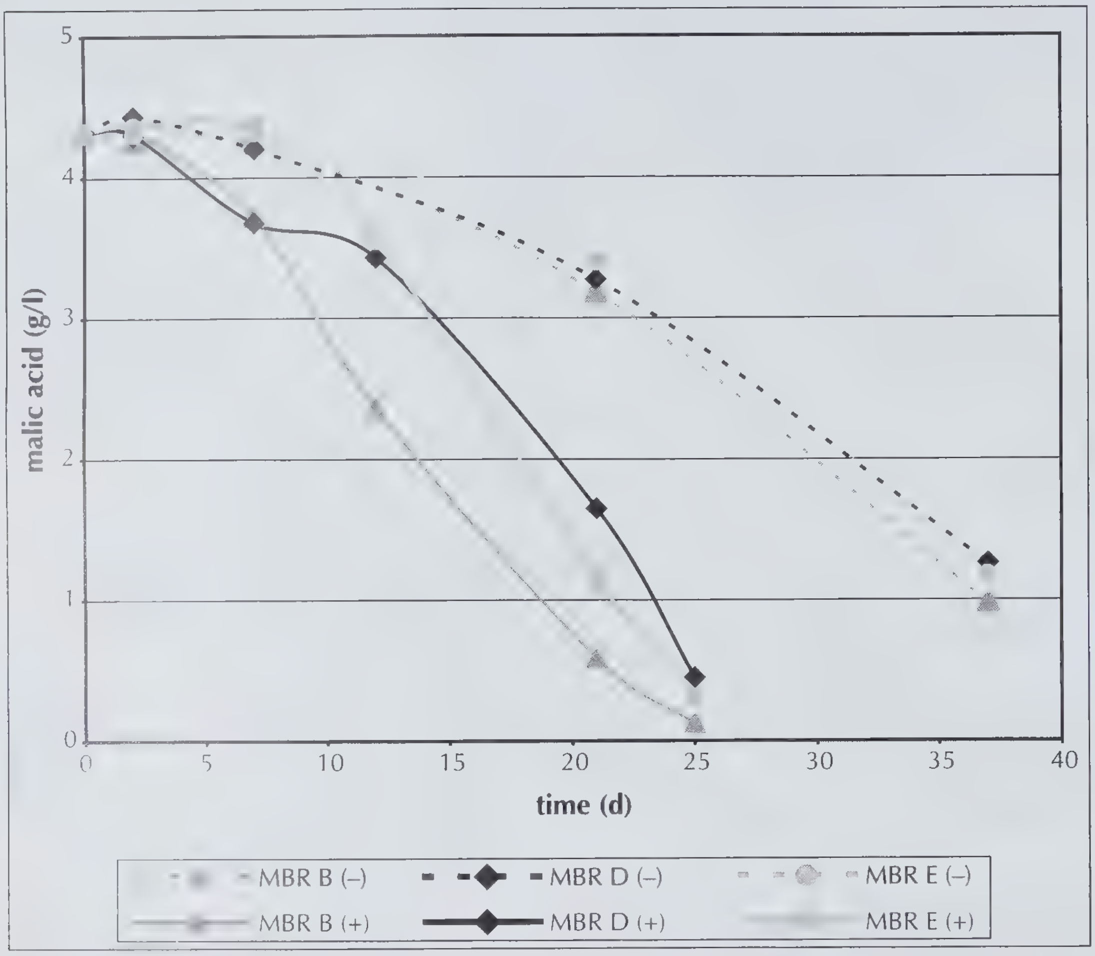

Figure II. Kinetics of malolactic fermentation in a 2003 Chardonnay wine (alcohol 14.1%, 14 ppm total SO_2, 3.38 pH) after direct inoculation with ML starter culture with (+) and without (–) addition of ML nutrient ActiML.

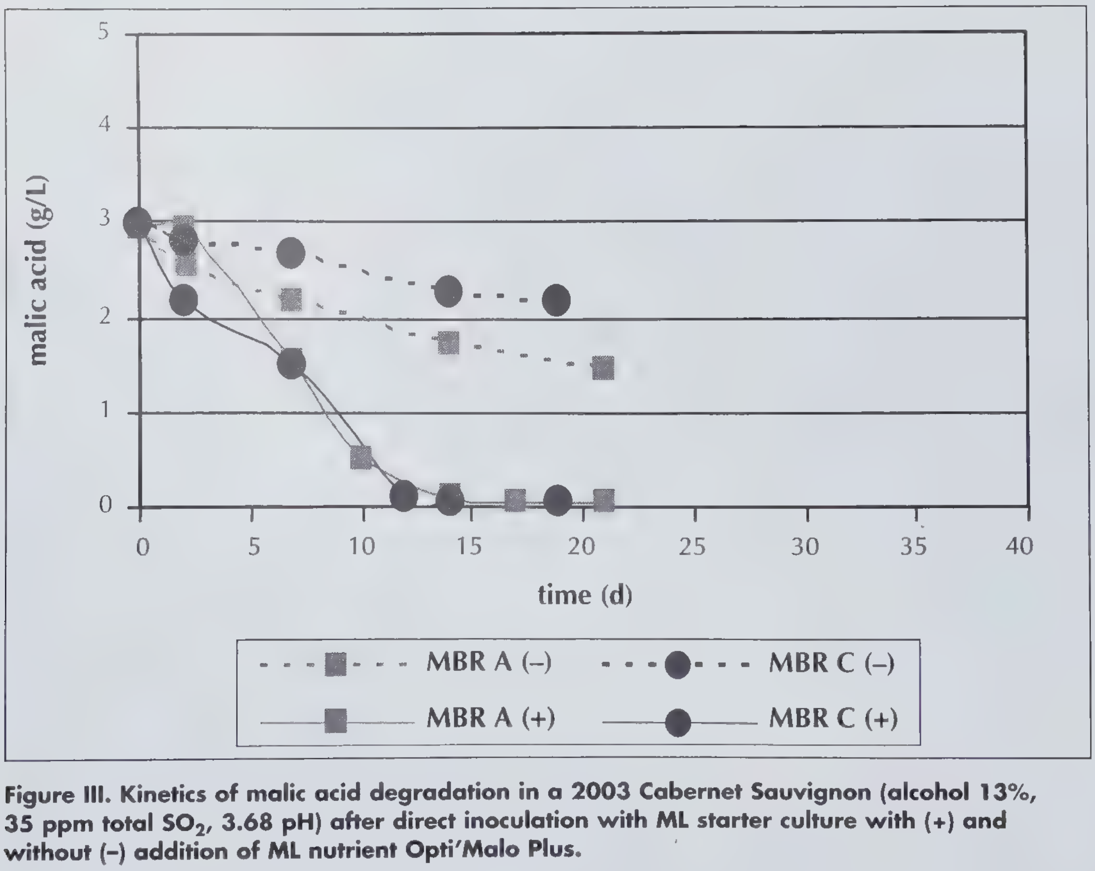

Figure III. Kinetics of malic acid degradation in a 2003 Cabernet Sauvignon (alcohol 13%, 35 ppm total SO_2, 3.68 pH) after direct inoculation with ML starter culture with (+) and without (–) addition of ML nutrient Opti'Malo Plus.

These nutrients comprise, first, a carbon or sugar source in the form of fructose, pentoses or glucose, and an organic source of nitrogen including amino acids and peptides. Inorganic forms of nitrogen such as diammonium phosphate (DAP), commonly used as an alcoholic fermentation aid for *Saccharomyces cerevisiae* cannot be utilized by *O. oeni*.

Vitamins are also necessary, especially the B-group and pantothenic acid vitamins. Other nutrients include trace elements such as magnesium, potassium, and manganese. A deficiency in any one or more essential nutrients, particularly in the harsh environment of wine, can impair the ability of *O. oeni* to grow and conduct MLF.

Bacterial nutrition – for a successful MLF

Over the last few years, some important applied research has brought better knowledge of the nutritional requirements of malolactic starter cultures in relation to the nutritional and physico-chemical demands that can be imposed by the wine environment.

For example, a wine that has been made using a fermentation yeast strain having a high nutrient demand is more likely to be depleted of growth factors that are necessary to support subsequent bacterial growth. Consequently, in such cases the addition of a bacterial nutrient is beneficial and will help to overcome potential difficulties of bacterial growth associated with nutrient deficiencies.

This is of particular importance in juices and musts already having a low nutrient status. Moreover, in nutrient- deficient juices and musts, certain yeast strains may potentially produce higher levels of SO_2 during alcoholic fermentation, which will be strongly inhibitory to malolactic bacteria. Overall, in order to avoid such problems associated with nutrient deficiency in grape juice and wine, it becomes essential to provide adequate nutrients that are specific for the fermentation yeast and, additionally, the malolactic bacteria.

From a winemaking perspective, timely inoculation of a suitably selected malolactic starter culture, in combination with a bacterial nutrient, provides distinct advantages towards optimizing wine quality and production.

In particular, use of a malolactic starter culture in combination with a bacterial nutrient not only facilitates the rapid onset of bacterial culture growth and MLF completion, but also assists in avoiding potential risks associated with delayed or stuck MLF. Such risks include development of undesirable micro-organisms including the spoilage yeast *Dekkera/ Brettanomyces* that are causative of "wet horse blanket," "bandaid," and other "Brett" associated off-odors and flavors.

This is explained by the fact that the nutrients added with malolactic starter culture facilitate a rapid onset and completion of MLF. Importantly, this, in turn, enables a winemaker to rapidly stabilize a wine with an early addition of SO_2, thus aiding in the overall protection against wine spoilage arising from uncontrolled microbial growth.

In practical terms, problems are often encountered when attempting to induce MLF in wines with difficult or harsh conditions. Such wines include those with harsh physico-chemical properties, are nutritionally-limiting, or in which alcoholic fermentation has been carried out with a yeast strain having a large nutrient demand, or a combination of one or more of these factors. Champagne base-wine would be the most common difficulty with a low pH under 3.1 or a Riesling. A wine temperature of 14°C (57°F) would be a harsh condition.

Supplying an appropriate nutritional source at the time of bacterial inoculation facilitates a faster onset of growth, and also greater survival, of the *O. oeni* culture. For such applications, Lallemand offers two bacterial nutrient supplements, ActiML and Opti'Malo Plus.

Formulated to be added at the rehydration step of the malolactic starter culture, ActiML is a specific inactive yeast blend that is rich in bio-available essential nutrients including amino acids, mineral co-factors, vitamins, and cellulose. By carefully preparing and rehydrating the malolactic culture in combination with ActiML bacterial nutrient, malolactic fermentation will begin more quickly.

To demonstrate the effects of the ActiML rehydration nutrient, Figure II shows the conduct of MLF in a Chardonnay wine (alcohol 14.1% vol, T-SO_2 = 14 ppm, 3.38 pH) after inoculation with three different malolactic starter cultures prepared with or without ActiML. Compared to the bacterial starter cultures prepared without any nutrient supplementation, the kinetics of malic acid degradation are much

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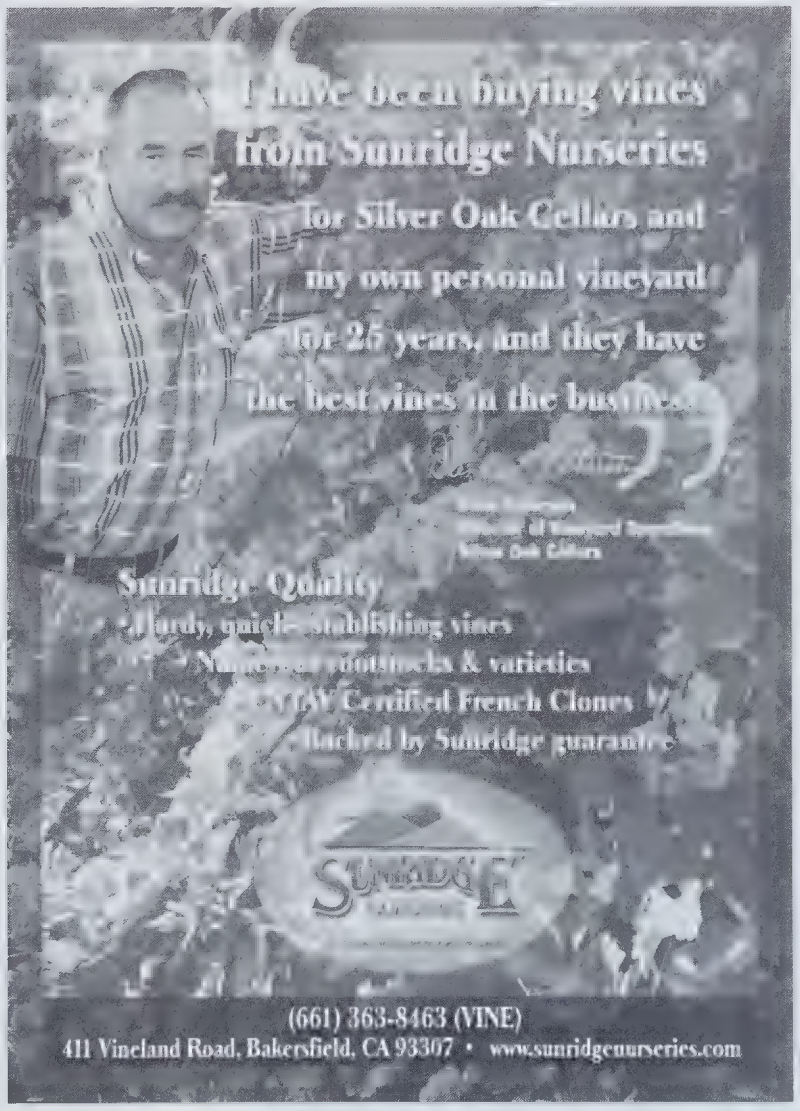
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faster for all three starter cultures when ActiML has been used during rehydration.

These results highlight the application of ActiML in preventing difficulties that can be associated with MLF induction. Its use is particularly recommended when either: slow malolactic fermentation has been experienced in previous years; nutrient levels in the must/wine are known to be low; when the yeast used for alcoholic fermentation is known to have a high nutrient demand, or under difficult wine conditions.

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Another nutrient for bacteria formulated by Lallemand, Opti'Malo Plus, is recommended as a supplement to aid the survival and activity of the malolactic culture and can be added to wine during MLF. The improved formulation of Opti'Malo Plus helps to sustain a difficult MLF, especially under limiting conditions (high alcohol, low pH, high SO_2).

As with ActiML, Opti'Malo Plus also consists of a blend of highly-enriched inactive yeasts with bioavailable amino acids and parietal polysaccharides. Results of trials with a 2003 Cabernet Sauvignon wine (alcohol 13% vol, T-SO_2 35 ppm, pH 3.68) clearly show the positive effect of using Opti'Malo Plus, with the different strains of malolactic starter cultures (Figure III). For both strains (A and C), malic acid degradation was completed in 12 days, whereas the same strains without benefit of Opti'Malo Plus were still slowly working on the malic acid degradation after 22 days. The gain in time for completing MLF is then considerable.

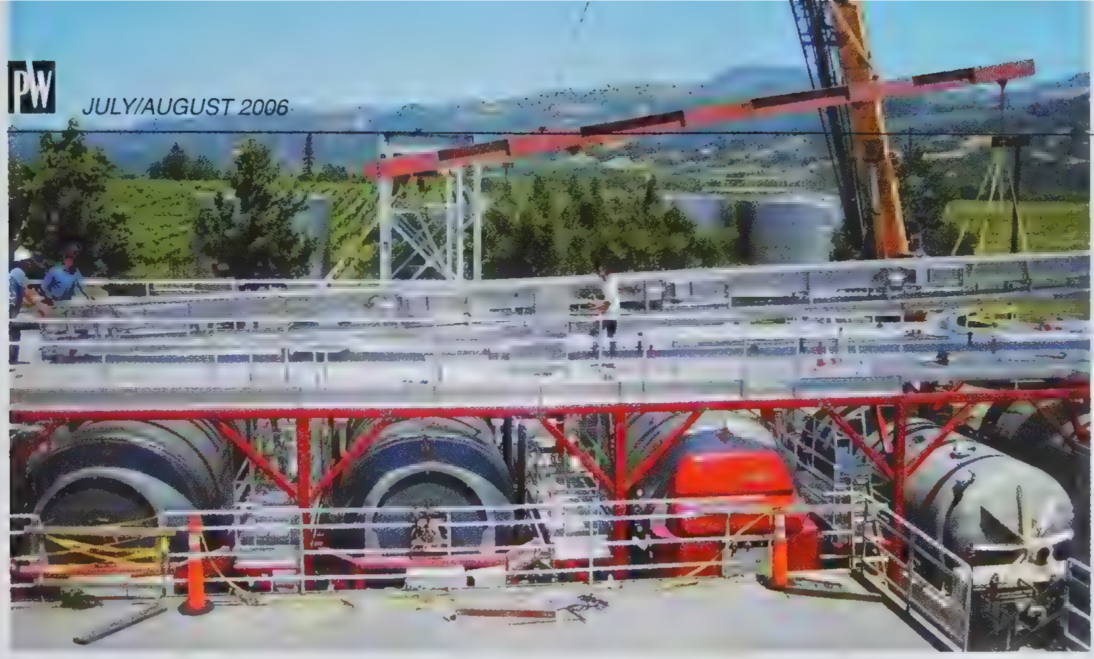
In addition to its application for preventing potential difficulties with MLF, Opti'Malo Plus can also, most importantly, be used in situations where, for example, wine that has been inoculated with a malolactic starter culture but MLF has not initiated or, alternatively, in wine that has initiated MLF but begins to slow down. In such situations, Opti'Malo Plus will aid in the completion of the MLF.

Conclusion

Malolactic fermentation is one of the most complex and delicate steps in winemaking. Successful completion is necessary to obtain a microbiologically stable product, and sensory properties that are balanced and pleasant.

Because of its complexity, and the specific nutritional requirements of

Continued on page 92



P&L Specialties installs the 105-foot long main belt conveyor for white grapes.

CLOS DU BOIS 2005

Innovations in grape receiving

BY Andy Woehl, process engineer,
Clos du Bois,
Geyserville, CA

In 2003, head winemaker Erik Olsen came to Clos du Bois with a vision of the wines he intended to make. In his vision, grapes would stay on the vine longer, which meant that Clos du Bois would have two weeks less time to receive all grapes than in previous years. When you're harvesting 24,000 tons, two weeks is a lifetime. Olsen and his team would have to take in 1,000 to 1,200 tons of white grapes plus 700 to 800 tons of red grapes every day.

Trying to accomplish this with the existing receiving system was "the straw that broke the camel's back." One hot September day in the middle of harvest, with 1,000 tons of the winery's best fruit scheduled to be harvested and pressed, one press stopped operating and the pomace discharge system broke down. The whole operation was down for four hours, and trucks filled with grapes sat in the parking lot. Olsen had been on the job for just two months.

Through the rest of the 2003 harvest, growers regularly waited four to eight hours to dump grapes, after their own 12-hour harvesting day.

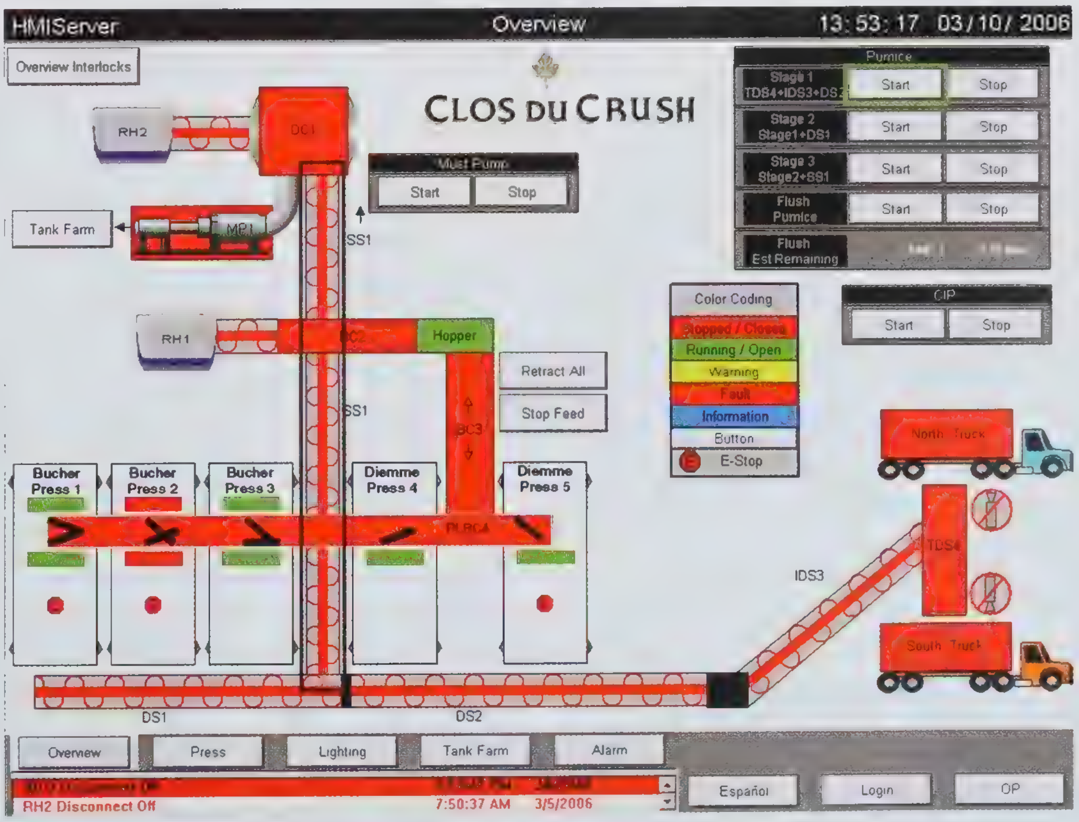
Olsen's first harvest made it clear that to press 1,000 to 1,200 tons of white grapes every day, the winery would have to build a new receiving pad.

Grape receiving history

Since Clos du Bois moved to its current location in 1991, production has grown from 150,000 to 1.75 million cases. A relatively simple crush pad of two small tank presses under a couple of large de-juicing tanks, and a destemmer/crusher for red grape receiving, was expanded in 1996 to carry white grapes on conveyors that fed directly into six tank presses with no destemming or de-juicing. This innovative system handled 500 tons of white grapes per day.

Unfortunately, the belt-conveyor delivery system had problems — such as belt slippage, undersized rollers, and belts that wouldn't stay on track. It always seemed to break down on the busiest day of harvest.

All pomace was removed by belt conveyors. The thinking was that since a much smaller motor ran the belts compared to auger systems, the belts



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Crushpad overview screen offers at-a-glance status of all operating equipment in the receiving area.

Remodeling crush pad.

Crush pad ready for press installation.

would use a lot less energy. This was true in terms of electrical energy, but the energy required to clean the waste belt was doubled. To keep from overloading the conveyor, press operators had to dump the presses very slowly and lost a whole press cycle by the end of every day.

"Cleaning the old waste belt and drainage system out was a vile mess that had to be done three or more times each day," recalls James Brewer, Clos du Bois crush pad operator.

In 2000, a second, smaller crush area with two 320hl tank presses was added to help white grape receiving and the pressing of the winery's growing volume of fermented red grapes.

Even with the new press pad, red and white grapes competed for operational attention, and white grape presses often sat empty as white grapes waited in trucks until all trucks delivering red grapes had been unloaded.

New pressing capability

After the 2003 harvest, the winemaking and operations teams created a two-year plan to gear up to handle Olsen's faster-paced harvest. Crush operations were the primary target, but if fruit receiving increased, the cellar and barrel room would also back up quickly. Projects had to be tackled in each department to reach production goals.

The crush pad was laid out with the following objectives:

- Receiving 1,000 to 1,200 tons of white grapes in a 24-hour day;
- Operation by seven people during peak periods;
- Centralized computer control and feedback system to manage the belt and press system and pomace removal;
- Standardized systems for easy maintenance, repair, and parts replacement;
- Easy traffic flow and access to all systems for efficiency;
- Development of a red fruit central receiving area, capable of receiving 800 tons of fruit/day;
- Expandability for future requirements of a 35,000-ton crush.

The plan

Site restrictions confined the new crush pad to the existing space, which is nine feet below ground level and wedged between two retaining walls. Plus, accomplishing all this in a package that fit the budget seemed impossible.

But after months of deliberation, the plan came together. There would be five tank presses — three 320hl, and two 280hl — to press white grapes, which would be fed by three belts. Only one new press would be added to four presses already at the winery.

Two 10-ton presses, would be moved to the red press pad for small premium red wine lots. Three more 320hl presses would be added in the future. Finally, the must-piping system would be overhauled to enable pumping fruit from both crush pads to anywhere in the winery.

Assembling construction team

The first phase to improve crush operations — installing a new waste auger under the existing crush pad — began in February 2004. This would handle all water drainage from the pad and keep all grapes out of the winery's wastewater stream. Brian Hemphill, facilities manager, invited three companies to look at the project, but it seemed so difficult that only P&L Specialties (Santa Rosa, CA) submitted a bid. Clos du Bois worked with P&L to refine the final mechanical layout.

Putting the 24-inch, 165-foot long screw-auger (driven by two 40 hp motors) under the existing equipment turned out to be a real challenge.

The first big lesson was in ground water, which flooded the excavation. Winery crews had to build a giant chauffeur dam to hold back ground water, while they got the drainage and concrete ready to set the auger.

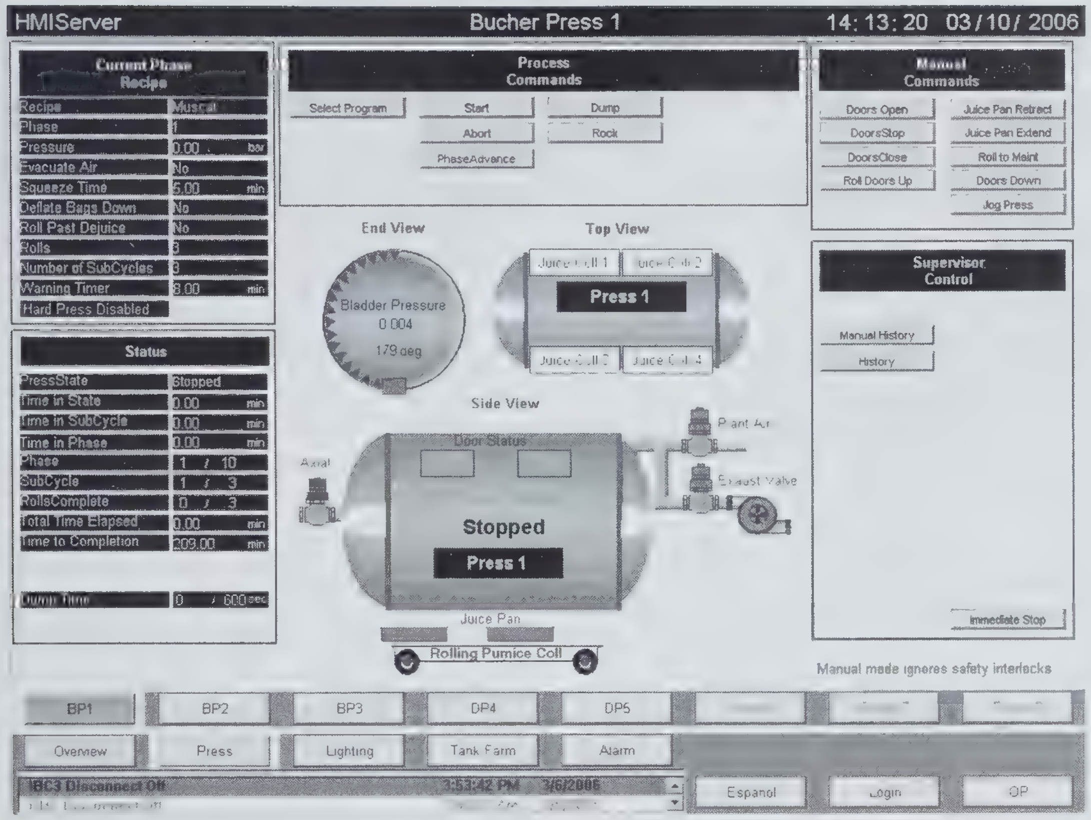
Ron West (concrete contractor) and Jay Ress from Sebastopol Construction, the winery's excavation contractor, were dedicated to meeting time lines to ensure that the winery would be ready for harvest. West and Ress kept right on working through 2005, helping out with all phases of the project.

The centralized computer control and feedback system was an important objective because the winery's previous system had four separate control panels to start and stop equipment. Most of the system gave a red light if something was not working, but the red light could mean any of a number of problems. Lack of access to the controls and not knowing what the problem was made operating the grape receiving system extremely difficult.

The engineering team from Rockwell Automation, (the makers of Allen Bradley components) designed, built, and programmed software to run these computer-controlled systems to winery specifications.

Start-up

After five months of construction, Clos du Bois was ready to start operating the new receiving pad, but none of the systems worked like the old ones. All controls for the presses, belt systems, and destemmer were replaced with four mouse-controlled PC computers. The operators didn't know where to begin.



Current Phase Recipe

Recipe	Muscat
Phase	1
Pressure	0.00 bar
Evacuate Air	No
Squeeze Time	5.00 min
Deflate Bags Down	No
Roll Past Dejuice	No
Rolls	3
Number of SubCycles	3
Warning Timer	8.00 min
Hard Press Disabled	

Status

PressState	Stopped
Time in State	0.00 min
Time in SubCycle	0.00 min
Time in Phase	0.00 min
Phase	1 / 10
SubCycle	1 / 3
RollsComplete	0 / 3
Total Time Elapsed	0.00 min
Time to Completion	203.00 min
Dump Time	0 / 600 sec

Bladder Pressure 0.004 179 deg

IBC3 Disconnect Off 3:53:42 PM 3/6/2006

Press control screen gives operators status of all press components.

If had it had been an early harvest, Clos du Bois would have been in trouble, but the winery was lucky and had a lot of time to train people. Staff tested and cleaned the systems until operators felt comfortable with the new controls. One of the features that facilitated training and made the process flow was that, with a click of a button, all controls could be converted to Spanish.

Receiving pad operators played a major roll in helping determine what needed to be changed. After they had experimented with the system and pointed out problems, programmers were able to institute many simple programming changes that improved the operators' ability to complete tasks.

Continued on page 92

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THE VINOTEC GROUP

WHO ARE WE? Lisa Van de Water, who has advised winemakers for 31 years, coordinates **an international group of labs and consultants.**

WHAT DO WE DO? Wine Quality Consultation. We consider the whole winemaking process, NOT just test numbers. We solve problems from vineyard to cellar to bottling, interpret microbe test results in practical terms, and advise on managing Brettanomyces and other spoilage microbes. We specialize in bringing current technical knowledge to real-life situations in wineries from large to small.

WHERE ARE WE? Well, everywhere. We have an office in Napa and affiliates in NZ, Chile, and South Africa, with microbiology test capabilities. Come to us, or we can go wherever you are. Confidentiality assured.

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Photo courtesy of Saverglass

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AMORIM CORK AMERICA

Amorim Cork America is the U.S. subsidiary of Amorim and Irmãos of Portugal, the world's largest manufacturer of natural cork closures. Amorim Cork America provides sales, service, and custom finishing services to wineries thoughtout the U.S.

Amorim recently introduced ROSA, a steam-distillation system that dramatically reduces the level of TCA in cork. ROSA's results have been confirmed by independent trials from the world's leading research laboratories.

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Amorim Cork America offers a full line of natural cork products:

Natural straight cork in standard 24mm diameter in 38mm, 45mm, 49mm, 51mm, and 54mm lengths are available in two washes: BWC or Natural.

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Colmated cork, a high-quality, low-cost alternative for wines meant for early consumption.

Neutrocork®, a micro-agglomerated closure made of ROSA-treated particles that make it price-competitive while maintaining excellent sensory values.

Amorim Cork America is a member of the Cork Quality Council. All corks are subject to GC/MS testing for TCA at ETS Laboratories prior to acceptance into inventory.

For more information, contact:
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Napa, CA 94558
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Screw caps are definitely on the rise in the wine industry. Mecmesin Corporation, a global supplier to wineries in Europe, Australia, and the U.S. offers the state-of-the-art Orbis Closure Torque Tester. This high-speed (1,000 readings per second) unit captures highly accurate (0.5%) removal breakaway and application torque values.

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Mecmesin has also supplied cork-extraction testing systems to wineries for many years. Its motorized test stand and specialized holding fixture meets all industry test standards, and assures both the winery and its customers the most satisfying experience when it comes to popping a cork.

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Sterling, VA 20166
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RAMONDIN USA, INC.

Ramondin has been making capsules for the wine industry since 1890. Ramondin was the first tin capsule manufacturer to receive the ISO 9001 certification, complying with strict standards of quality, safety, and service, and the ISO 14000 certificate, which has special emphasis on protecting the environment.

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Tin is an excellent replacement for environmentally-undesirable metals and plastics. Ramondin buys the purest tin and processes the silvery metal into a perfect closure. Ramondin's continued commitment to protecting the environment has led to development of water-based paints — no more solvents.

Recyclability is one of tin's great merits. Ramondin's recycling program encourages wineries to save plastic trays for reuse in new tin capsule orders. This is a huge project, but one that Ramondin feels is the right thing to do to reduce packaging waste and keep out of our landfills.

"Think green. Think Ramondin … capsules and only capsules for over 100 years."

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ENCORE!

ENCORE! has been supplying and serving wineries since 1975 and has grown to fulfill the glass and packaging needs of over 400 wineries in the western United States. ENCORE! has attained this growth by giving each customer the individual attention they deserve.

ENCORE! distributes more than 55 wine bottles in nine different colors with various finishes that range in sizes from 187ml to five liter. ENCORE! also carries a wide selection of European styles for special products and does label removal, bottle washing, sterilization, decanting, and repacking.

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ENCORE! supplies molded wine shippers in two- and three-pack formats with matching cartons that meet Wine Institute/CAWG purchasing guidelines for sustainable packaging. The two-pack trays are available in two-, four-, six-, and 12-pack shippers; three-pack trays in three-, six-, and 12-pack shippers.

For more information, please contact:
ENCORE!
860 S. 19th St., Richmond, CA 94804
tel: 510/234-5670; fax: 510/234-0433

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CRYOTECH INTERNATIONAL, INC.

Cryotech International, formerly VBS, a leader in liquid nitrogen delivery systems for oxygen displacement, can help wineries reduce headspace oxygen and extend shelf-life in screw cap packages while maintaining taste.

As wineries transition to screw caps, winemakers are presented with new, unique challenges. Although screw caps eliminate the concern of "cork-taint," screw cap bottles have a greater volume of headspace. Wine is exposed to oxygen trapped in the bottle headspace which, in turn, can result in increased dissolved oxygen levels, even after the cap is applied. Cryotech can help.

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After installing a Cryotech injection system, one winery reports dissolved oxygen content of less than 0.03 ppm without compromising the fresh fruit taste of the wine.

For more information, contact:
Cryotech International, Inc.
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tel: 408/371-3303; fax: 408/371-3320
e-mail: salesinquiry@vbsflex.com
website: www.cryotechinternational.com

RIVERCAP USA

RIVERCAP, a family-owned company based in Spain, specializes in production of premium quality tin capsules for wine, and now also offers polylam capsules to U.S. wineries. Polylam capsules are made from a layered composite of aluminum foil, polyethylene, and aluminum that gives them the look and feel of tin capsules.

RIVERCAP was the first capsule manufacturer to exclusively produce tin from the outset. All punching, painting, and decorating machines are designed and built in-house. Each machine incorporates innovative improvements to increase decorating capabilities to meet increasing demands of marketing and design departments.

Registered silkscreen colors on the side, and either embossed or silkscreened top decorations, are all standard features. Material thickness can range from 80 microns for the standard bottleneck finish, to 140 microns for new fat-neck bottles.

Sizes range from the 27.00 mm 33.25 mm diameter for standard 750 ml bottles and larger sizes are available for 3, 5, and 6-liter bottles.

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The **RIVERCAP** in-house design department can design and develop decorations to match labels, and colors are blended to match either Pantone references or a customer's particular color swatch. All paints provide superior resistance to scuffing.

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ZORK ... seals like a screw cap, pops like a cork.

For more information, contact:

Encore!

North American distribution: Justin Davis

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AROL USA, INC.

The new Quasar Corker is the latest innovation in corking from AROL USA Closure Systems. The Quasar uses a floor-mounted sorter and a vacuum transfer tube to present the cork to a rotary pick-and-place device, which delivers a cork to an individual corking head. AROL's modular design allows the corker to be installed as a stand alone machine, or part of a filler/corker mono-bloc system.

Available in sizes from one to 24 heads, the Quasar Corker provides production speeds from 50 to 800 bpm. The Quasar rotary corking machine is capable of supplying flushing gas and/or vacuum in any sequence of operation the customer desires.

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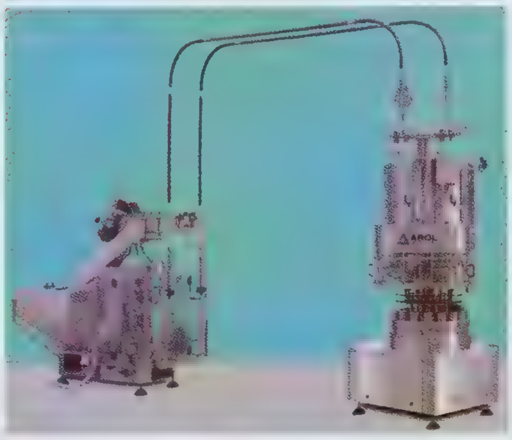

For more information, contact:

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450 Satellite Blvd. NE, Ste. D

Suwanee, GA 30024

tel: 678/318-1290; fax: 678/318-1296

e-mail: salesusa@arol.com

website: www.arol.com

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APCOR —
PORTUGUESE CORK ASSOCIATION

Founded in 1956, APCOR stands for *"Associação Portuguesa da Cortiça"* — Portuguese Cork Association, and is based in Santa Maria de Lamas, near Porto in Portugal.

With over 280 members, APCOR exists to represent and promote the cork industry and all cork products. It offers membership to companies that produce, sell, and export cork products.

Both nationally and worldwide, APCOR supplies information about cork and the cork industry, including details of cork industry legislation, cork production statistics, press information, a newsletter, a multimedia library, a press-clipping service, and information resources such as CD-ROMs, brochures, and videos.

In association with the Cork Technology Center (CTCOR), universities and other research centers, APCOR promotes and has funded millions of dollars for industry research. This research includes quality control, environmental issues, energy conservation, technology and innovation, industry strategies, and hygiene and safety at work.

APCOR provides a range of technical and managerial advice, including legal advice, financial advice, compliance with EU regulations, industrial accreditation norms and processes, management and organization methods, quality assurance, and environment and energy conservation issues.

For more information, contact:

APCOR —

Portuguese Cork Association

Avenida Comendador Henrique Amorim,

No. 580

P - 4536 - 904 Santa Maria de Lamas,

Portugal

tel: +351 22 7474 040; fax: +351 22 7474 049

e-mail: realcork@apcor.pt

website: www.realcorkusa.com

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VITRO PACKAGING, INC.

Vitro Packaging, Inc. has been supplying the wine industry innovative wine packages for over 20 years and offers a full line of European and American wine bottles in cork and screw-on finishes. Glass color selections include dead leaf, champagne, antique, and emerald green in addition to blue and smoke.

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Please visit Vitro Packaging's website at vitropackaging.com, or call Lee Whalen, at the Napa office 707/258-9470.

For more information, contact:
Vitro Packaging, Inc.
Lee Whalen
876 Green Island Rd.
American Canyon, CA 94503
tel: 707/258-9470
website: www.vitropackaging.com

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WS PACKAGING GROUP, INC.

WS Packaging Group is an industry leader with over 40 years of experience in printing and flexible packaging. Capabilities and services include: pressure-sensitive labels, tags, coupons, decals, folded cartons, printed tape, overwrap, thermal transfer labels and printers, label application equipment, security tags, RFID solutions, and much more.

WS Packaging Group's San Luis Obispo, CA facility specializes in wine label production and is one of the few label printers offering both pressure-sensitive and sheet-fed glue-applied labels, utilizing flexographic, offset, and web-offset production. WS Packaging Group's focus is ultra high-end wine labels, meeting discriminating winery demands with exact color matching, tight registration, metallic foil application, sculptured embossing, intricate die-cutting, and just-in-time delivery.

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WS Packaging Group has multiple manufacturing facilities across the U.S. and over 75 sales representatives for local and regional sales and service. The facilities offer full service in-house art departments for design and prepress and in-house research and development teams for innovative and creative product constructions. The company web site is an informational source and an interactive business-to-business on-line service for customers. WS Packaging Group is the only company that can offer this level of service, capabilities, and experience with flexographic, offset, web-offset, flat-bed screen, rotary-screen, and digital printing within one organization.

For more information, contact:
WS Packaging Group, Inc.
1102 Jefferson St., Algoma, WI 54201
tel: 800/340-3424 x6231; fax: 920-487-7074
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PICKERING WINERY SUPPLY

Pickering Winery Supply distributes natural corks from Korkindustie TRIER. This century-old German company employs rigorous, systematic control of the entire cork production process, from washing and grading of corks in Germany to extensive SPME testing and statistical analyses of the risk-failure one can expect from each lot.

TRIER does grade its corks by physical appearance, but far more significantly, corks are graded according to the likelihood of possible cork taint. Making 40 SPME tests for every homogenous lot of 50,000 1¾-inch (44mm) corks, Trier is able to take raw numbers and statistically predict the percentage of corks at risk. The two levels offered are TOP and SELect: the fewer possible failures, the more expensive the cork.

"TRIER is uniquely capable of quantifying the percentage of TCA-affected corks and the subsequent possibility of 'corked' bottles,'" says Kendall Pickering.

TRIER is firmly convinced that natural corks remain the best closure for fine wines and makes every possible effort to assure there will be the fewest off-flavors as possible.

Wineries desiring to test the safest natural corks available should contact Pickering Winery Supply for more information and samples.

For more information, contact:
Pickering Winery Supply
888 Post St., San Francisco, CA 94109
tel: 415/388-6656; fax: 415/388-6833

PLEASE SEE PICKERING WINERY SUPPLY AD, PAGE 49.

SCOTT LABORATORIES, INC.

Scott Laboratories is one of the oldest American suppliers of packaging materials to the North American wine and beer industries. For over 50 years, it has been on the leading edge of the industry, emphasizing quality, service, and innovation. Scott Labs offers a broad range of products, including natural corks, screw caps, champagne corks, and wirehoods.

Scott is a founding and continuing member of the Cork Quality Council continuing to work to control and eliminate TCA in corks. Scott screens all corks for TCA using SPME machinery in Portugal and at ETS Laboratories.

Scott Laboratories now offers screw caps from Alplast Chiusure SpA with a broad range of artwork abilities such as hot stamping. Printing can be done using lithographic and offset processes. Several liner options are available.

For champagne corks and wirehoods, Scott Laboratories continues its long-term relationships with Relvas Corticas and ICAS SpA. Relvas Corticas is unique among champagne cork suppliers. All wood is purchased directly from the forest and all materials are sourced and processed in-house. ICAS is the world's largest and most advanced producer of wirehoods and the leading supplier in Europe, North America, and Australia.

For more information, contact:
Scott Laboratories, Inc.
PO Box 4559, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com
website: www.scottlab.com

PLEASE SEE SCOTT LABORATORIES AD, PAGE 44.

SAVERGLASS, INC.

Saverglass leads the market with new bottle creations in the wine industry. Many bottles are being used in unique ways to work with an ever-evolving breed of marketers wanting to appeal to an inquisitive and fickle consumer. The lines drawn between extreme and original are blurred and, for this reason, Saverglass has created new bottle designs: Feng, Massalia, and Theos. There is no limit to the innovative ideas that evolve into the bottles of tomorrow.

Saverglass is best at customization with private designs or based on its own proprietary shapes. As wine consumers want the highest quality, Saverglass offers all necessary options in glass decoration, with the best available quality, innovation, and service. Saverglass constantly expands possible future options for its customers.

Call for a showroom appointment and review the 2006 Portfolio #5, highlighting top Saverglass products created over the past year. Saverglass is both ISO 14001 and 9001 certified and meets the highest standards of quality in the industry.

SaVer
glass

For more information, contact:
Saverglass, Inc.
Daniel Repoux, president and CEO;
Sylvie Langois, sales account manager;
Aurora Noel, sales account manager;
Jyll Castangia, sales account manager; **Carol Tracy**, sales administrative manager.
841 Latour Ct., Suite B, Napa, CA 94558
tel 707/259-2930; fax: 707/259-2933
website: www.saverglass.com

PLEASE SEE SAVERGLASS AD, PAGE 61.

KEYES FIBRE CORPORATION

Keyes Fibre introduces the "1-2 Bottle Shipper," a unique design that will accept most bottle shapes. The Keyes shipper has passed both UPS and FEDEX shipping tests.

Keyes Fibre provides laydown trays for most Burgundy and Bordeaux bottles in three, four, and six-bottle configurations. Trays can be used in single and triple combinations. For example, some wineries use two, three-bottle trays for cartons of six bottles, or three, four-bottle trays for a carton of 12 bottles. Champagne style trays come in three- and four-bottle configurations, and Alsace comes in a three-bottle tray.

The molded fiber laydown trays facilitate both filling the carton and carton placement. Keyes Fibre eliminates the danger of label scuffing by properly fitting bottles in cartons.

To view Keyes Fibre's complete fibre wine packaging line, please refer to www.keyesfibre.com.

For more information, please contact:
Keyes Fibre Corporation
Sue Akers
3715 Chelan Hwy., Wenatchee, WA 98801
tel: 509/663-8537 ext. 223
toll free: 800/786-8517
fax: 509/662-1023
e-mail: sakers@keyesfibre.com

NuKorc USA, inc.

NuKorc Pty. Ltd. was established in 1996 to produce innovative closure products. Today, NuKorc manufactures and supplies high-quality single-extruded synthetic closures to the global wine industry.

NuKorc™
Sealing Your Future

NuKorc's mission: "To protect and enhance our customers' products and brands." This philosophy reflects a focus on the development of long-term partnerships with customers. To achieve this mission, NuKorc strives to offer closures that consistently fulfill the following key technical performance criteria:

- Organoleptic excellence — no taint or flavor modification;
- Good barrier properties — wine stays in the bottle and oxygen ingress is controlled;
- Consistent performance — minimum bottle variation.
- Ease of application using standard closure insertion equipment;
- Ease of extraction, and re-insertion into bottle after opening;
- Functional excellence across the wide range of distribution and storage conditions that can be experienced by bottled wine after it leaves a winery.

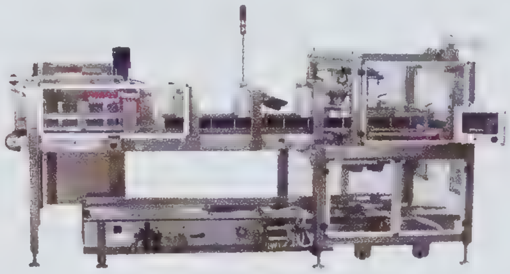
NuKorc's closures are available in a range of colors that can be used to create stunning packaging design. Closure size can be tailored to bottle type and product characteristics. Customer artwork can be printed onto the closures in two colors to high standards of definition.

For more information, contact:
NuKorc USA, Inc.
Ben Atkins VP — U.S. Operations
470 Technology Way, Napa, CA 94558
tel: 707/224 3066; fax: 707/224 3077
mobile: 707/799 0195
website: www.nukorc.com

PLEASE SEE NUKORC USA AD, PAGE 63.

Standard-Knapp, inc.

Standard-Knapp, a worldwide leader in the manufacture of innovative packaging machinery has been serving the wine industry for over 112 years. A pioneer in the field of automatic packaging equipment, Standard-Knapp provides robust, efficient packaging solutions such as bottle packers, case packers, tray packers, tray loading machines, and shrink wrappers.



Bottle packers range from high-speed rotary packers with capacities of 70 cases per minute to small, nimble intermittent-motion packers for low-volume operations. Standard-Knapp has developed new technology to handle "reverse-tapered" wine bottles, which are traditionally difficult to convey and pack. Customized designs and layouts are available to fit into existing lines to meet current and future production needs.

Standard Knapp
an EMPLOYEE owned company

Simplicity, reliability, and quick changeover define Standard-Knapp designs. The company provides 24-hour support and quick turnaround on spares and change parts — all domestically fabricated. They also supply change parts for competitors' bottle packers. Equipment leasing is available. With over 100 years of experience, Standard-Knapp continues a tradition of "making packing easy."

For more information, contact:
Standard-Knapp, Inc.
63 Pickering St., Portland, CT 06480
tel: 860/342-1100 ext. 238; fax: 860/342-1557
e-mail: info@standard-knapp.com.

PLEASE SEE STANDARD-KNAPP AD, PAGE 48.

Alcan Packaging Capsules of California

Alcan Packaging Capsules of California is committed to serving wineries with sharp-quality capsules: tin, polylam, sparkling, and STELVIN® screw caps. Alcan produces capsules in American Canyon, CA, with a lead-time of four to six weeks, and is the only supplier in this competitive market to do so. The Alcan team is devoted to providing the best service.

First in the wine market with the revolutionary STELVIN® screw cap closures, Alcan offers the new variety of STELVIN® called STELVINLUX® in 2006. This screw cap for wine is uniquely designed with plastic threading on the inside of the cap, providing a smooth outer surface. This closure offers a larger surface for custom decoration (top embossing, side printing) — making this new STELVIN® product as beautiful as drawn tin capsules.

Alcan is committed to excellence in environment, health, and safety. Alcan's goal is to protect and promote all communities where the company operates. The American Canyon plant is certified ISO-14001 and OSHA-S18000.

For more information, contact:
Alcan Packaging Capsules
of California
5425 Broadway St.
American Canyon, CA 94503
tel: 707/257-6481; fax: 707/257-8028
e-mail: frederic.catteau@alcan.com

PLEASE SEE ALCAN PACKAGING AD, PAGE 51.

CORK SUPPLY USA, INC.

For 25 years, Cork Supply USA has been *redefining quality* in the cork industry. Starting with the first independent cork quality lab in Portugal, Global Quality Control, rejecting cork lots not meeting standards to the recent introduction of our patented INNOCORK process which removes TCA from cork.

Other firsts in redefining quality include:

- First U.S. company to establish vertical integration in every aspect of production from forest to bottle,
- First to provide quality assurance test results with every shipment,
- In conjunction with the Natural Cork Quality Council, set meaningful SPME standards used by the entire industry,
- First to set SPME rejection levels at 2 ng/l for every bale of corks.

CORK
SUPPLY
USA

Cork Supply USA offers a complete line of wine corks, including: natural, 1+1's colmated, champagne, and large diameter corks. With an inventory of over 50 million corks, and a product line-up from its sister company Newpak USA, Cork Supply USA can meet the demands of any winery.

Cork Supply USA's devotion to continually redefining quality assures its customers that every product is unsurpassed in quality, service, and value.

For more information, contact:
Cork Supply USA, Inc.
537-F Stone Rd., Benicia, CA 94510
tel: 707/746-0353; fax: 707/746-7471
e-mail: sales@corksupplyusa.com
website: www.corksupplyusa.com

PLEASE SEE CORK SUPPLY AD, PAGE 2.

BERGIN GLASS IMPRESSIONS, INC.

Bergin Glass (BGI) has provided premier glass decorative services to the wine industry since 1989. BGI built its reputation on creating high-end artisan work, beginning with etched and hand-painted wine bottles. The staff has been with the company for over ten years, constantly building on their capabilities. This decorating option has been almost exclusively reserved for large format sizes — 1.5L to 27L.

In 1996, BGI added decorative services of direct screen-printing and decal applications. Wine labels are produced on one-color, two-color, and six-color machines. Direct-screen printing has been growing in popularity as the wine industry becomes more knowledgeable on the merits and benefits of this type of packaging. Direct-screen printing allows designers and wineries to be bolder and more creative in their label design, by allowing more use of the overall bottle surface — front and back.

BERGIN
GLASS IMPRESSIONS

Production managers and winemakers welcome screen-printed bottles, because they do not create disruptions on the bottling line. Labels can never be scuffed, applied crooked, wrinkle, or appear to bubble and fog (think pressure-sensitive).

In February, 2006, BGI moved into 24,000 sq. ft. of new production space, with a commitment to serve the wine industry another 18 years. BGI will continue to develop unique and exciting wine label packaging that reflects the passion and personality of owners and winemakers alike.

For more information, contact:
Bergin Glass Impressions, Inc.
2511 Napa Valley Corporate Dr., Ste. 111
Napa, CA 94558
tel: 707/224-0111; fax: 707/224-4185
e-mail: mike@berginglass.com
website: www.berginglass.com

PLEASE SEE BERGIN GLASS AD, PAGE 37.

SUPREMECORQ

Since 1992, SupremeCorq has offered quality-leading synthetic closures to the wine market, and is the only synthetic closure company in the world to achieve ISO 9001:2000, American Institute of Baking, and British Retail Consortium quality certifications. All closures are recyclable and comply with FDA and EU regulations.

SupremeCorq offers the new SupremeCorq X2, with more uniform cell structure and consistent external dimensions, engineered to significantly reduce oxygen permeability and enhance aesthetics of the closure. The X2 has twice the oxygen barrier properties of the current SupremeCorq, providing long-term sealing potential and neutrality.

SupremeCorqs offer a TCA-free seal to ensure wine consistency and are available in three sizes: 45mm, 38mm, and T-Top (pull closures). Available in any color, SupremeCorqs can enhance wine packaging and be printed with FDA-compliant color inks that do not rub off.

SupremeCorqs are injection-molded. The outer skin completely seals the closure, making it easy to remove and re-insert, protects the internal cell structure, and prevents wine absorption.

Every SupremeCorq order is quality-tested for density (length, weight, diameter), coating consistency, and insertion/extraction force, to ensure optimum product performance.

More than 1,600 wineries worldwide use SupremeCorqs to preserve their wines exactly as their winemakers intended.

For more information, please contact:
SupremeCorq
5901 S 226th St., Kent, WA 98032
tel: 253/395-8712; fax: 253/395-8713
e-mail: jimc@supremecorq.com
website: www.supremecorq.com

PLEASE SEE SUPREMECORQ AD, PAGE 19.

SAINT-GOBAIN CONTAINERS

As a leading glass supplier to American wineries, Saint-Gobain has a legacy of product innovation, craftsmanship, and customer attention that spans two continents and three centuries.

After more than 300 years as one of Europe's premier bottle makers, Saint-Gobain started in America in 1995 as Ball-Foster Glass, an entity formed from the union of two U.S. companies, each with more than 100 years of distinguished glassmaking experience. Today, Saint-Gobain Containers continues to uphold that tradition of excellence, having been awarded more than 45 Clear Choice Awards from the Glass Packaging Institute.

SAINT-GOBAIN
CONTAINERS

Saint-Gobain Containers is proud of its partnerships with America's most accomplished vintners and of the part its products have played in the growing worldwide recognition of American wines.

For more information, please contact:
Saint-Gobain Containers
Marilyn La Grange
1509 S. Macedonia Ave., Muncie, IN 47307
tel: 765/741-7622
website: www.sgcontainers.com

M.A. SILVA CORKS USA

M.A. Silva Corks, USA is constructing a new Sonoma County facility to increase production capacity and quality control. The 30,000-square-foot structure will provide 50% more workspace and production capacity, with the ability to improve customer service while maintaining the highest standards of quality control.

A 250% larger laboratory will provide winemakers with greater access to sensory evaluation testing. M.A. Silva Corks subjects corks to a multi-level process of sampling, testing, acceptance/rejection, adhering to the strict Cork Quality Council guidelines.

M.A. Silva Cortiças, Lda. was awarded ISO 22000:2005 food safety certification in December 2005. It was the first cork producer in the world to garner the distinction. ISO 22000 incorporates the principles of the Codex HACCP (Hazard Analysis and Critical Control Point) system for food hygiene.

CORK PROCESSING
ALL CORK PRODUCTS

In conjunction with their vertically-integrated Portuguese supplier, M.A. Silva Corks, USA maintains complete data on all incoming stock. Shipment information coupled with in-house protocols allows them to give customers the satisfaction of knowing they are receiving wine corks that have successfully achieved the highest standards of quality control.

For more information, contact:
M.A. Silva Corks USA
975 Corporate Center Parkway, #125
Santa Rosa, CA 95407
tel: 707/636-2530; fax: 707/636-2531
e-mail: info@masilva.com
website: www.masilva.com

PLEASE SEE M.A. SILVA CORKS AD, PAGE 69.

GRAHAM PACKAGING COMPANY

California Glass Company has an exclusive distribution agreement to market Graham Packaging Company's PET bottles to California wineries. Their first offering is a 187ml barrier-bottle for wine, and other sizes may become available.

California Glass
A Saxco Company

Bottles are produced using Graham's patented ShurShot™, 5-layer injection blow-molding process, with two discreet layers of proprietary oxygen-scavenging barrier material. This construction assures that virtually no oxygen will ingress into the bottle during its shelf life. Unlike monolayer PET bottles, no preservatives are required in the wine to provide a shelf-life equivalent to glass in this size. The bottle has a 25mm finish for a tamper-evident aluminum roll-on screw cap, and is available in clear, dead leaf green, and champagne colors. Bottles are produced in Modesto, CA.

The bottles are 100% recyclable. The weight savings are particularly attractive to airlines, for improved fuel efficiency. Consumers like the bottle for its light weight and unbreakability, making the bottle a natural for consumption in and away from the home.

GRAHAM
PACKAGING
COMPANY, L.P.

Graham Packaging Company is an international producer and marketer of high-performance plastic packages for food and beverages, headquartered in York, PA. California Glass Company is a distributor of glass, plastic, closures, and adhesives.

For more information, contact:
California Glass Company
Terry Sanzo, Business/Marketing Mgr.
tel: 510/635-7770
e-mail: tsanzo@calglassco.com
OR
Graham Packaging Company
Ellen Hoover, Director Beer, Wine & Spirits
tel: 859/727-7548
e-mail: ellen.hoover@grahampackaging.com

G-3 ENTERPRISES

Three years ago, four companies that served wineries individually for up to 45 years joined forces to become G-3 Enterprises. This combination of skilled people and technologies has become a natural line-up of related operations. G-3 Enterprises, with headquarters in Modesto, CA, has four divisions to serve as a single-source solution for wineries: labels, closures, bottle decorating, and logistics.

QUALITY · VALUE · SERVICE · ENTERPRISES
G3

The Label Division supplies sheet-fed glue-applied labels, flexo pressure-sensitive labels, and pre-press services. It also provides value-added hot stamping, embossing, and die cutting on labels and now manufactures its own inks for superior color control. The printing plant serves short-run demands in addition to long-run needs by using a narrow web pressure-sensitive flexographic press.

The Closure Division manufactures roll-on pilfer-evident aluminum caps, capsules, liners, and other closure materials. It also produces the only domestically manufactured 30mm x 60mm long flange Royal 90™ screw cap. Laboratory testing services are now available.

The Bottle Decorating Division offers two distinct bottle decorating technologies: heat-transfer labeling for permanently affixed labels, and value-added bottle etching.

The Logistics Division provides freight, warehousing, and other logistical support for case goods, bulk materials, bulk liquid transport, and grape hauling.

For more information contact:
G-3 Enterpirses
Kyle Rossler, VP Sales/Marketing
502 E. Whitmore Ave., Modesto, CA 95358
tel: 209/341-7770
e-mail: kyle.rossler@g-3enterprises.com
website: www.g-3enterprises.com

PLEASE SEE G-3 ENTERPRISES AD, PAGE 29.

COLLOPACK SOLUTIONS

ColloPack Solutions is a leading provider of integrated bottling lines and grape processing systems. ColloPack offers a comprehensive line of bottling equipment from single machine replacements to complete lines. These lines include the Bertolaso Cleaner/Filler/Corker/Capper Bloc, Robino & Galandrino capsuling equipment, Cavagnino & Gatti P-S and wet glue labelers, Francesca pumps, and Bertolaso automated conveying systems.

ColloPack also provides engineering, project management, installation of equipment, conveyors, and electrical, and after-sales service and parts programs customized to each wineries' needs.

COLLOPACK
SOLUTIONS LLC

For more information, contact:
ColloPack Solutions
Dave Means, Phil Giacalone, Rick White, Joe Mironicki, Mike Wlodarczyk, Craig Richardson or Greg Fulford
193 Camino Dorado, Napa, CA 94558
tel: 707/258-3940; fax: 707/258-3949
e-mail: sales@collopack.com
website: www.collopack.com

PLEASE SEE COLLOPACK SOLUTIONS AD, PAGE 15.

GANAU AMERICA

With total, end-to-end control of the cork production process, Ganau America goes above and beyond standard industry practice at every step with extra effort to ensure top quality and take every possible precaution against development of cork taint.

GANAU
CORK TRADITION & TECHNOLOGY

Ganau offers responsiveness, quick turnarounds, and close attention to every detail. The dedication to quality and service has earned the loyalty of customers — winemakers who want the best.

In 1995, Ganau introduced **TF** technology, the industry's first non-chemical deep-cleaning steam process for natural corks, granules, and discs. It established a new industry best practice that other producers have since worked to emulate. Now Ganau is again leading the way with **Ganau Revolution™** — another major advance to control cork taint.

The **Rain Autoclave** was designed to purify cork planks with super-heated water droplets and steam. This non-immersion system allows cleaning at higher temperatures (up to 120°C) than other boiling methods. Hotter water means higher pressure to drive purifying steam even deeper within cork lenticels. Use of fresh, pre-heated water for each batch eliminates any risk of cross-contamination (less advanced boiling systems merely filter and recirculate water.)

For more information contact:
Ganau America
21750 Eighth St. East, Sonoma, CA 95476
tel: 800/694-CORK; fax: 707/939-0671
e-mail: mariella@ganauamerica.com
website: www.ganauamerica.com

PLEASE SEE GANAU AMERICA AD, PAGE 55.

ACI CORK USA

Science and Art — Grown To Perfection describes ACI Cork USA.

The company has found a powerful balance of technology and tradition to provide the American wine market with the finest natural and technical cork closures available. It uses both time-honored methods and rigorous scientific testing to reach its goal of producing a cork stopper of impeccable quality.

The new Dras-Red processing system, implemented in 2005, uses dry steam to produce remarkable results against TCA.

ACI CORK USA

ACI is a founding member of the Portuguese Cork Quality Institute and has received the Certified Company Trophy for compliance with the ISO 9002 Quality Assurance System. ACI is compliant with the rigorous HACCP standards, originally drafted for NASA.

NEW PRODUCT: **Aglica Micro-Granular Corks**, an attractive, environmentally-friendly alternative to synthetic closures. Samples and technical specifications are available.

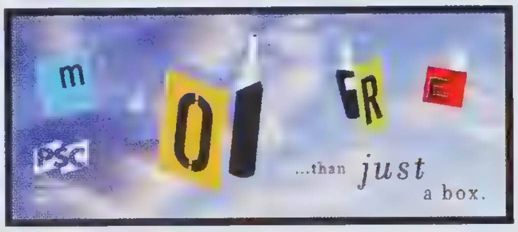
ACI's facilities are newly equipped and technologically sophisticated. The new ACI Cork USA has a 30,000 square foot state-of-the-art processing plant in Fairfield, CA. ACI welcomes customer visits to any of its facilities.

For more information, contact:
ACI Cork USA
Armando Andrade, GM;
Phillip Durrett and Russell Warren, Sales
2870 Cordelia Rd., Ste. 150
Fairfield, CA 94534
tel: 707/426-3566; fax: 707/426-2358
e-mail: info@acicorkusa.com
website: www.acicorkusa.com

PLEASE SEE ACI CORK AD, PAGE 44.

PACIFIC SOUTHWEST CONTAINER

Founded in Modesto, California in 1973, Pacific Southwest Container (PSC) is one of the West Coast's premier providers of packaging solutions. PSC's unique ability to provide a comprehensive array of services — all in-house from planning and design, to manufacturing and delivery — allows the company to provide customers with creative and cost-effective solutions to meet production needs and satisfy marketplace demands.



PSC has designed and produced thousands of innovative product packaging solutions to meet the changing needs of a diverse marketplace. The wine industry has proven to be an area where creativity is welcomed and embraced. High impact graphics and unique shapes that deliver a message are an important part of conveying a winery's brand image, and PSC can accommodate.

Whether it is a 1-color Kraft content box, or a 9-color, UV-coated, foil-stamped and embossed 3-liter bag-in-box, PSC can handle the project from concept to consumer.

For more information, contact:
Pacific Southwest Container
Bryan Smith
4530 Leckron Rd., Modesto, CA 95353
tel: 800/772-0444; fax: 209/522-8746
e-mail: bsmith@teampsc.com

NOMACORC — USA/INTERNATIONAL

In 2005, Nomacorc launched a new family of nomacorc® synthetic wine closures: Light, Smart, Classic, and Premium – each designed to meet the needs of winemakers and their wines. These new products have found great success with their new and existing customers.

nomacorc® light — For the value-priced market segment and light-styled wines.

nomacorc® smart — For all wine varietals in the popular-priced wine market segment.

nomacorc® classic — Protecting many premium international brands — the industry standard for synthetic wine closure performance.

nomacorc® premium — The most advanced product to date. Ideal for winemakers seeking longer-term cellaring. Available third quarter 2006.

nomacorc®
"Simply a Better Closure."

"Nomacorc is experiencing phenomenal growth," says James Herwatt, CEO of Cork Supply / Newpak, USA. "In 2005, the company surpassed its goal of selling more than one billion wine closures worldwide."

Nomacorc, Inc. is certified ISO/9001. All nomacorcs comply with British Retail Consortium and Institute of Packaging "Global Standards for Packaging." Consistent yearly growth, proven quality, strong business alliances, and best technology practices combine to offer Nomacorc customers "Simply a Better Closure."

For more information, please contact:
Nomacorc — USA/International
400 Vintage Park Dr., Zebulon, NC 27597
tel: 919/460-2200
e-mail: info@nomacorc.com
website: www.nomacorc.com

PLEASE SEE NOMACORC AD, PAGE 22.

OENÉO CLOSURES USA

Oenéo's parent company, founded in 1939, ranks as the world's second largest supplier of cork-based wine closures and supplies all major wine-producing regions of the world.

DIAM

Oenéo supplies technological closures (REFERENCE & DIAM for still wines, ALTOP for spirits, and MYTIK for sparkling wines), the S-CAP (a screw cap offering two levels of permeability), and a wide range of natural corks that meet all budget requirements. DIAM is the only cork closure with levels of TCA so low that they cannot be measured, providing winemakers with a clean closure with the highest acceptance level among wine consumers — beware of imitations!

In a world of new, exciting, and creative wine product packaging, Oenéo Closures believes *there is no one perfect closure for every wine,* and Oenéo Closures strives to assist winemakers in selecting the right wine closure from an assortment of options.

oenéo
CLOSURES USA

Oenéo Closures USA was founded in 1995. You are invited to visit the Napa, CA production facility and meet the dedicated employees.

For more information, contact:
Oenéo Closures USA
902 Enterprise Way, Ste. M, Napa, CA 94558
tel: 707/256-2830; fax: 707/256-2831
website: www.oeneoclosuresusa.com

CASTORO BOTTLING COMPANY

Since 1989, Castoro Bottling has served wineries throughout California with a fleet of high-tech mobile bottling lines. The demand for Castoro Bottling's timely, professional, and knowledgeable service has triggered the bottling of over 48 million bottles of wine with natural corks, synthetic corks, or screw caps.

Castoro Bottling offers three technologically-advanced mobile bottling lines that arrive on your schedule to serve all your bottling needs. Castoro Bottling can bottle up to 2,500 cases per day, serving any size winery. A number of custom services are offered, including labeling and packaging consultation. Recognizing the need for wineries to offer alternative closures, Castoro Bottling has outfitted two of the bottling lines with screw cap capabilities.

CASTORO BOTTLING Co.
CBC
FILLING YOUR NEEDS

"Our investment in the best equipment and the best people to run that equipment is what sets Castoro Bottling apart," says Niels Udsen. "We anticipate the needs of a winery better than any other bottler simply because I have owned and operated a successful winery for over 20 years. Castoro Bottling is a partner who knows and understands your business."

Since 2005, Castoro Bottling Company has offered Velcorin dosing. Please call today, or visit www.castorobottling.com for more information.

For more information, contact:
Castoro Bottling Company
Niels Udsen
PO Box 954, Templeton, CA 93465
tel: 805/467-2002; fax: 805/467-2004
e-mail: Niels@castorobottling.com
website: www.castorobottling.com

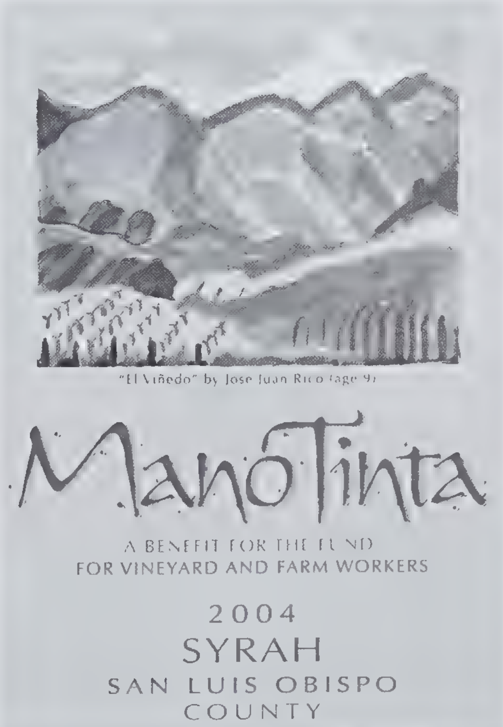
PLEASE SEE CASTORO BOTTLING AD, PAGE 27.

Benefits of wine

The Fund for Vineyard and Farm Workers provides grants to local organizations whose work benefits local agricultural workers. Emphasis is placed on programs such health care, after-school programs for children, and ESL (English as a second language) instruction. The fund is administered by the San Luis Obispo County (CA) Community Foundation, www.sloccf.org.

The group hopes to generate $50,000 in 2006, from the sale of the newly-released Mano Tinta (Spanish for "red hand"). Mano Tinta is a blend of Syrah (Hazel Talley Vineyard, Paso Robles), Tempranillo (Laetitia Vineyard & Winery, Arroyo Grande), and Petite Sirah (Wolff Vineyards, Edna Valley) produced entirely with donated grapes, goods, and services. Suppliers Scott Laboratories, Shirley Howell Graphic Design, WS Packaging, Encore Glass, and SLO Bottling all contributed materials for the wine's production.

518 cases of wine were bottled. The 2004 Mano Tinta is available for $18 per bottle at www.talleyvineyards.com.



"El Viñedo" by Jose Juan Rico (age 9)

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Bacterial nutrition

Continued from page 76

malolactic bacteria necessary for successfully completing MLF, it is recommended to add specific nutritional products that are especially developed for lactic acid bacteria. Difficult wine conditions (low pH, high alcohol, and high SO_2) are particularly detrimental to the lactic acid bacteria and are best overcome by:

- Selecting and preparing the most suitable malolactic starter culture using appropriate strain selection guidelines and following instructions for starter culture preparation.
- Prepare the bacterial starter culture with a specific nutritional supplement such as ActiML at rehydration, to enable a greater probability of acclimatization, and therefore facilitate satisfactory MLF completion and aid in prevention of MLF difficulties, **especially in difficult wine conditions.**
- Carefully monitor and strategically supplement the malolactic starter culture **during** MLF with a specific nutrient such as Opti'Malo Plus, if malolactic fermentation is struggling, or as a security to avoid potential problems associated with delayed or stuck MLF. ■

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Clos du Bois

Continued from page 79

Benefits of our new crush pad and systems are huge," states Erik Olsen. "We have made fabulous gains in winemaking quality, winemaking communication, operations, and efficiency."

Olsen's goal in redesign was to harvest grapes when ready based on ripeness, not when the crush pad could accommodate them, and now the winery is doing just that.

Early morning cool temperatures are critical to fruit quality. The winery can handle more truckloads of red and white grapes arriving in the morning hours. Operators can also manage large and small lots of fruit and even have the best equipment to hand-sort high-end fruit on belts, such as the proprietary Calcaire Chardonnay grapes.

Control of the solids level in pressed juice have been improved by the whole cluster delivery system. The winery retained the option to destem/crush and axial-feed as a back-up system. Solids generate astringency and bitterness, so efficient delivery to the presses is important.

Thanks to these significant improvements in winemaking operations, winery management has "really arrived in the 21st century!" Computer technology, accessible from anywhere in the winery, has improved the tracking of grape data dramatically.

"Improved crush crew communications allows us to reformulate plans easily to make the best harvest decisions," explains Olsen. "In such a big system, changes are a way of life during harvest, and better communication means an easier time handling those changes."

Operations staff found a few areas to improve on for the 2006 harvest, such as tracking and staging of grape trucks and transferring data to winemaking faster — but the ability is there. The new receiving system and computer controls have been built to handle all of those needs.

Conclusions

Despite these areas needing improvement, during the 2005 harvest, Clos du Bois received a record high of 26,500 tons of grapes with considerable ease compared to previous years.

Looking into the future of new wines, new ownership, and continued system development, Clos du Bois has a platform and system that are ready to expand with more presses, flexible technology for new systems, and a team that can handle the possible challenge that a harvest can bring both in English or Spanish. Innovative methods will increase productivity and quality. ■

First grapes on new receiving system.

Beech Baron 58 aircraft, similar to Don Franscioni's B55. Photo courtesy, Aircraft Owners & Pilots Association (AOPA).

Private aircraft pays off for Central Coast grower

BY Robert Goldsmith

Dan Franscioni's taste for flying is as keen as his taste for winegrapes. Franscioni, one-half of Franscioni Brothers, Inc., in Salinas, CA, regularly flies one of two company airplanes or a helicopter to check crop growth or scope out problems before they germinate into crises.

"You can see a lot from the air that you would not detect on the ground," says Franscioni, whose lifelong passion for flying led to earning his private pilot's license in 1990.

Franscioni Brothers farms 1,800 acres of winegrapes, 2,500 acres of row crops such as lettuce, spinach, and broccoli, and 1,000 acres of asparagus, in Monterey, San Benito, and San Luis Obispo counties.

Chardonnay, Riesling, Pinot Noir, Cabernet Sauvignon, Cabernet Franc, and Merlot grapes are delivered to Kendall-Jackson, Mariposa Winery, and Robert Mondavi (now part of Constellation), among others. The company sells more than 8,000 tons of winegrapes annually.

One key to his success, Franscioni asserts, is his ability to fly over the vineyards. Both he and his brother, Ray, fly a Maule M5 Rocket "tail-dragger," a Baron B55 twin-engine, four-seat aircraft, and a Robinson helicopter. The Maule, which is configured like an aerobatic plane, with two front wheels and a third at the rear, is particularly adept at flying in and out of small areas. Dan Franscioni logs about 200 to 300 hours per year.

Franscioni's son Tom, who earned his wings at age 18, also flies for his dad's company, and is currently attending airframe and powerplant school to obtain his mechanical degree.

"Flying keeps us very competitive and efficient," he says. "We get a lot more done in one day than we could traveling in a pick-up."

Flying offers many practical benefits to entrepreneurs and other business people, according to the non-profit Aircraft Owners & Pilots Association, which sponsors Project Pilot **(www.projectpilot.org)** to help new aviators. Many flight schools offer an introductory flight lesson at discounted prices (from $49 to $89).

Franscioni indicates that flying is the best way to survey vineyards — particularly given his farming operations in multiple areas. He uses his aircraft to fly over the vineyards, two to three times each week, looking for disease patterns, problems with irrigation, wind patterns, and stand problems. "When I identify a problem, I can address it immediately," he says.

Sometimes that involves a trip to the San Joaquin Valley for parts — for grape harvesters, tractors, irrigation equipment, or anything else used to tend the vineyards. That's where the Baron comes in. Having a son who flies also comes in handy for many of these trips.

"It's quicker to fly any one of our aircraft to get a needed part than relying on FedEx," he says. One time, a harvester

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Tom (left) and Don Franscioni.

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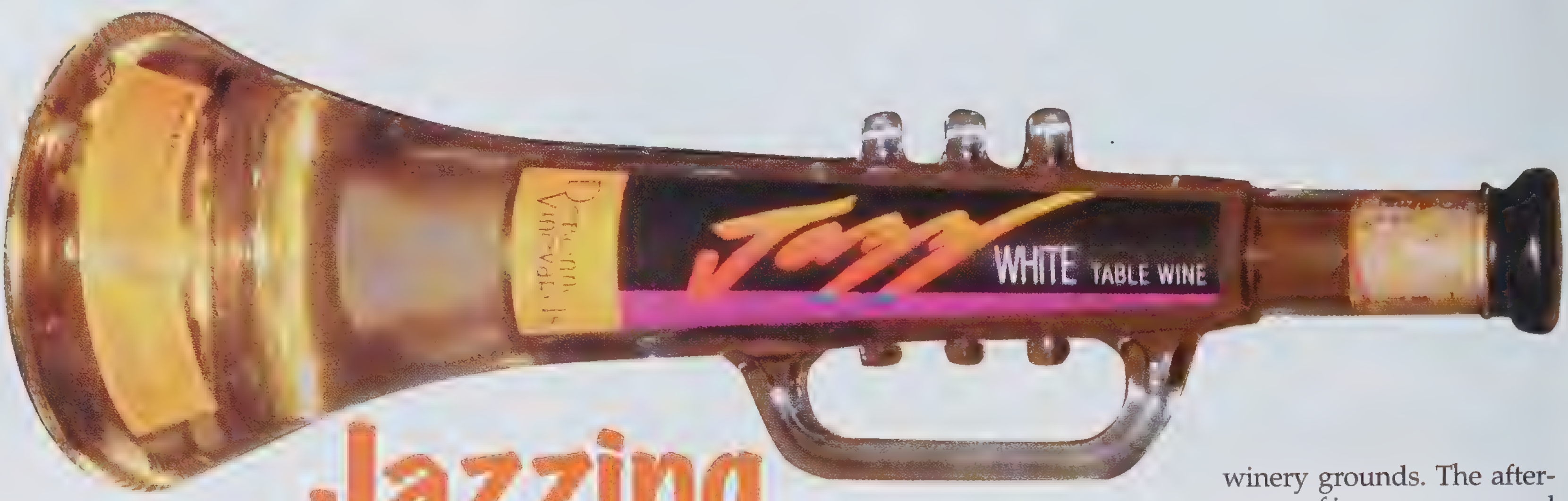


Jazzing up wine appeal

BY Millie Howie

Often, in the wine regions of the world, participants in wine-related events are presented with a glass with the winery or event logo silkscreened on the bowl as a souvenir. Eventually as a wine lover attends more tastings, visits more wineries, or takes a few wine appreciation courses, the stock of glasses outgrows cabinet space and a good many of the memories the glasses were meant to stir are lost in the crowd.

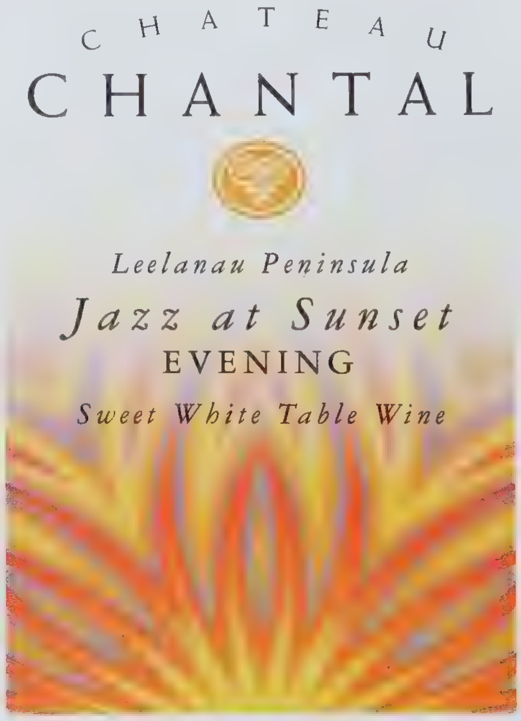
Most memories deserve better treatment than that, and a couple of wineries in Michigan and Ohio have set about providing souvenirs that prod the far recesses of the mind with sight, scent, and savor.

In Traverse City, Michigan, Chateau Chantal serenades visitors with "Jazz at Sunset" concerts performed by the Jeff Hass Jazz Trio each Thursday night throughout the summer months. Now set for the 13th season, the concerts are free and open to the public. Adding visually and deliciously to "Jazz at Sunset" is a trio of specially created wines called Twilight, Evening, and Tonight.

Each is a blend of Chardonnay, Gewurztraminer, and Riesling in varying proportions created by winemaker Mark Johnson. "Twilight" is a semi-dry (1.5% RS) wine. "Evening" has a luscious, sweet finish (3.0% RS), and "Tonight" is a sparkling Blanc de Blanc. All three sell for under $13 for the 750ml bottle, and "Tonight" is also available in a 187ml size for about $4. Production of each of the three is just over 350 cases and what makes the wines so collectible is the "jazz" label designed by Tim Nielsen and Emily Mitchell at Michigan's Nielsen Design Group.

The art was first used in 2003 on the cover of a commemorative CD-album cut by the Jeff Hass Trio in celebration of the winery's tenth anniversary. When Chateau Chantal's operations manager, Elizabeth Berger suggested that the art would make a great label, the design team adapted it to the label format and the wines were introduced along with the CD.

In the summer of 2004, Debonne Vineyards in Madison, Ohio (near Lake Erie), initiated "Jazz on the Vine," a series of free concerts presented on the winery grounds. The afternoons of jazz are sponsored by First Merit Bank and the smooth jazz FM station, The Wave at 107.3, on the last Sunday in June, July, and August from 2 till 6 PM.



A multi-colored label was designed by the renowned Cleveland artist Hector Vega for "Jazz White," a blend of Chardonnay, Riesling, and Pinot Grigio (0.4% RS) offered in a 750ml bottle for $10 and in a unique trumpet-shaped bottle with its own exclusive jazz label for $25. Total production of Jazz White is 800 gallons per year.

None of the "jazz" wines is recommended for cellaring but as a souvenir to tease the senses, they jog the memory of a delightful day of music, wine, and food each time they appear on the table or in a picnic basket.

Both Debonne Vineyards and Chateau Chantal also produce personalized labels for their patrons to celebrate any special occasion, as do a growing number of small wineries across the U.S. Outstanding in this facet of label making is Windsor Vineyards in Healdsburg, CA which has built a reputation as America's premier direct-to-the-consumer wine merchant over the last 30+ years.

It is even getting easier for individuals to add to their wine enjoyment by creating a memory-stirring label of their own. According to California label designer Chuck House, "With the new pressure-sensitive papers that are increasingly available, almost anyone can run his/her design through a laser printer, trim the print, and apply it to a bottle of their favorite wine." Add a little jazz and the picture is complete. ■

PERSONNEL POINT OF VIEW

by Andrea Salvemini

Increase your possibilities with 360-degree feedback

"What would you attempt to do if you knew you could not fail?" —ANONYMOUS

What a question! What a world of possibilities that it opens! What are those possibilities if not the potential for doing or becoming something in the future? What holds us back from meeting our potential? Failure or fear of failure can be a huge barrier to moving forward.

In organizations, fear of failure and individuals' inability to reach toward their potential may make the difference between an organization that succeeds in all facets and one that never seems to reach its goals. It may mean the difference between the employee who is energized, innovative, and a valuable contributor and the employee who is just "surviving" and doing the minimum in order to skate by.

How can we create an organization that thrives on embracing new possibilities and constantly searching for improvement? How can we bring this spirit to our managers and leaders, to individual contributors at all levels?

By providing individuals with opportunities for growth in a culture that values ideas and open communication channels, we can create the organization that will move beyond the fear of failure toward new and exciting possibilities. One of the simplest, yet most powerful ways to do this is by using 360-degree feedback. When utilized properly, 360-degree feedback assessments can help individuals realize their potential by providing them with clear, constructive feedback from many sources.

What is 360-degree feedback and how do you know if it is right for your organization? Providing 360-degree feedback is a method of gathering information about a manager's performance from peers, direct reports, and his or her boss. When used properly, it is a tool that can help the individual understand others' perceptions about how they do what they do. It also provides valuable feedback on the participant's self-perception and how this compares to others' perceptions.

These 360-degree feedback assessments can aid participants in narrowing the gap between how others see them and how they see themselves. It can be used as a platform for open communication and provide a critical springboard to discuss tough issues. It can strengthen a team and assist in creating a plan to achieve strategic goals and objectives. If not used properly, it can intensify unspoken issues and create unrealistic expectations. Following the right process, however, will create rewards that will last indefinitely.

How can you maximize the impact of your 360-degree feedback? There are several key steps that will assure that your process yields positive and impactful results.

Utilize an experienced professional

We strongly suggest working with a professional management consultant who has had experience with 360-degree assessments, coaching, and feedback in order to implement these assessments at your winery. Having an outside party administer the process and provide the feedback can make a huge difference in how effective the assessments will be. If the results are reported and compiled outside the company, participants and raters are likely to be more honest in their feedback, as it will "not be held against them."

As you work with a consultant, use the following questions as a guide to make sure that the process and results enable you to achieve your goals.

What are the results that you want to achieve by using a 360-degree feedback instrument?

It is important to be clear about what outcome you expect from the instrument. Do you want your managers to become better leaders? Do you want your managers to become more skilled in communicating with their team? Is turnover high in your organization and do the managers have the skills to select and develop the best talent? Is conflict dealt with in a constructive manner? A 360-degree assessment can be a huge catalyst in improving results in all of these areas, and the key is clarity before the process starts. This will determine what questions you ask during the assessment.

What do you want to measure?

There are a huge number of 360-degree assessment tools available to choose from. Once you are clear on the results that you want to achieve from the tool, you are better equipped to determine what the best method to measure is.

Instruments can measure leadership style, personality and behavior, and job-related skills and perspectives. They can measure how people communicate information, the level of risk-taking and innovation that an individual has, how individuals influence others, and how they deal with pressure, etc. You can use a standard assessment or you can create a custom one based on the organization's leadership model or what the role of the leader is in your organization.

Here are a few other things to consider when choosing your assessment tool:

- Is the tool valid and reliable?
- It the tool easy to use?
- Are the results easy to understand and utilize?
- How are the results reported? Are they presented individually by rater or in an aggregate form?

- Are the raters anonymous?
- Do you want an online version or paper-and-pencil version?
- Is there a development-planning guide or workbook?
- Are you able to see comments from the raters?

Are the participants ready to do the work?

Participants need to be open to giving and receiving feedback. They need to be able to look at their strengths and developmental areas and be willing to make a commitment to work on their developmental areas. The organization can support their efforts by coaching, training, and different programs. Examples include work/life balance programs, cross-functional teams, and reorganizations.

What can we do to make the process effective and assure that the results are being used?

a. **Pre-assessment orientation and planning session** — Participants must be clear as to what the expected outcomes of the process are, what the process entails, who their raters should be, and how to use the feedback. It is important that the individuals know what to expect, so they see "possibilities" instead of "fear."

b. **Coaching and feedback sessions** — Feedback can be given to individuals in an individual coaching session or group feedback session. The method chosen depends upon the results desired and the areas that are measured. It is important for the results to be delivered and discussed in a constructive and coaching manner. Delivery and coaching by a professional coach or human resources consultant aids in the anonymity of the process and increases receptivity of the participant. Ideally, the coach will be the consultant who has administered the entire process and is familiar with the individuals and their challenges.

c. **Link to development plan** — Results can be linked to each individual's personal development plan. It is suggested that each person pick a maximum of three areas to work on and then create specific action plans with target dates for completion.

d. **Accountability** — Creating a way to hold each person accountable for his or her development plans and actions is important. If participants know that a process has been set up that will hold them accountable to work on their developmental areas and show results, the carry-over for the process will be much stronger than if no process is set up.

When is the "right time"?

After you determine what results you would like to achieve from implementing a 360-degree feedback process in your organization, you can look at timing. If the participants are ready to do the work and consider making improvements, the time is right. It is important, however, to keep the 360-degree feedback process separate from the performance review process.

The performance review is based on *measurable results* and can have significant consequences for the recipient, while the 360-degree assessment is oriented toward individual growth and development. It is based on *perceptions* of the participant's performance from a variety of people, not just the recipient's supervisor.

Performance reviews can be used for individual development as well, yet the "360" will not measure results that are needed in a performance review.

Results from 360-degree feedback assessments can be astounding. They can open doors to new and exciting possibilities for individuals and organizations. By taking the time to do the work up front, and committing to the developmental process after results have been given, you and your managers can avoid failure and turn possibilities in to realities. ■

Andrea Salvemini is the Director of Business Development with The Personnel Perspective, a human resources consulting, training, and recruiting firm in Santa Rosa, CA. Since 1987, The Personnel Perspective has been a leading full-service human resources consulting firm in northern California, helping companies leverage their greatest asset — their people — by recruiting, training, and motivating them. The Personnel Perspective assists organizations in implementing successful 360 degree assessments. Andrea can be reached at 707/576-7653 or direct 415/499-5696.

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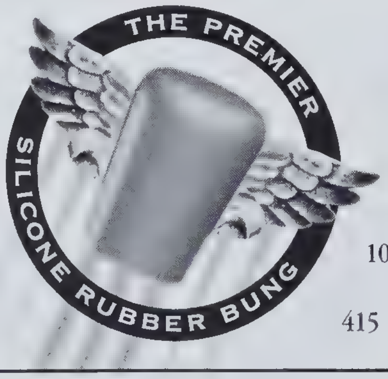

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Airplane continued from page 93

broke down in the middle of the night. "We flew to San Joaquin Valley that same morning to get the part, and were back in operation within hours, instead of days."

Often, an airport isn't even required. "I can land between vineyards, on straight access roads. The Maule can take off or land within 400 feet."

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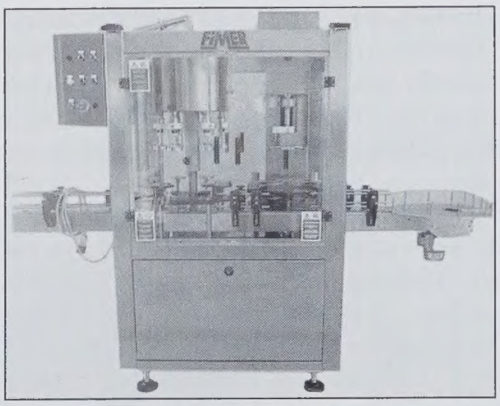

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find Franscioni doing a few loops or barrel-rolls. "I love flying of all kinds," he says. "My son and I even took up skydiving, and we've made over 60 jumps each."

Flying allows the two Franscioni brothers to avoid the gridlock of the California highway system. Members of the California Asparagus Growers Association, they fly themselves to annual meetings in the San Joaquin Valley, wine events hosted by Kendall-Jackson in Santa Rosa, and other industry functions around the state.

When he's not flying for his agricultural concern, he frequently heads off with his sons to Oregon, Nevada, or the Sierra Nevada mountains to hunt big game. It's not unusual to fly back with an elk carcass in the cargo hold. "Try flying with that on a commercial airline," he says with a grin.

Learning to fly is not particularly difficult or expensive. Becoming a private pilot runs anywhere from $3,000 to $7,000, depending on location and the student's motivation. The Federal Aviation Agency (FAA) requires a minimum of 40 hours flying time to qualify for a private pilot's license — including at least 10 hours of solo flying. The average rate is $90 to $125 per hour, including aircraft rental, fuel, and instructor fee. (Solo hours don't entail instructor fees.)

There's also ground school, which prepares the student for the written and oral exams required to earn a certificate. A basic medical exam conducted by an FAA-approved physician is required.

Once licensed, purchase of a plane is not required. Many pilots rent the planes they fly. For a basic single-engine aircraft, rentals cost $60 to $100 per flight-hour, including fuel. You pay only for the time the engine is running, not the time you have the plane. It's like paying Hertz only when the wheels are turning. Plane trips are so fast (they're often 10% to 20% shorter in miles traveled), the per-hour rate can make for a very reasonable trip cost.

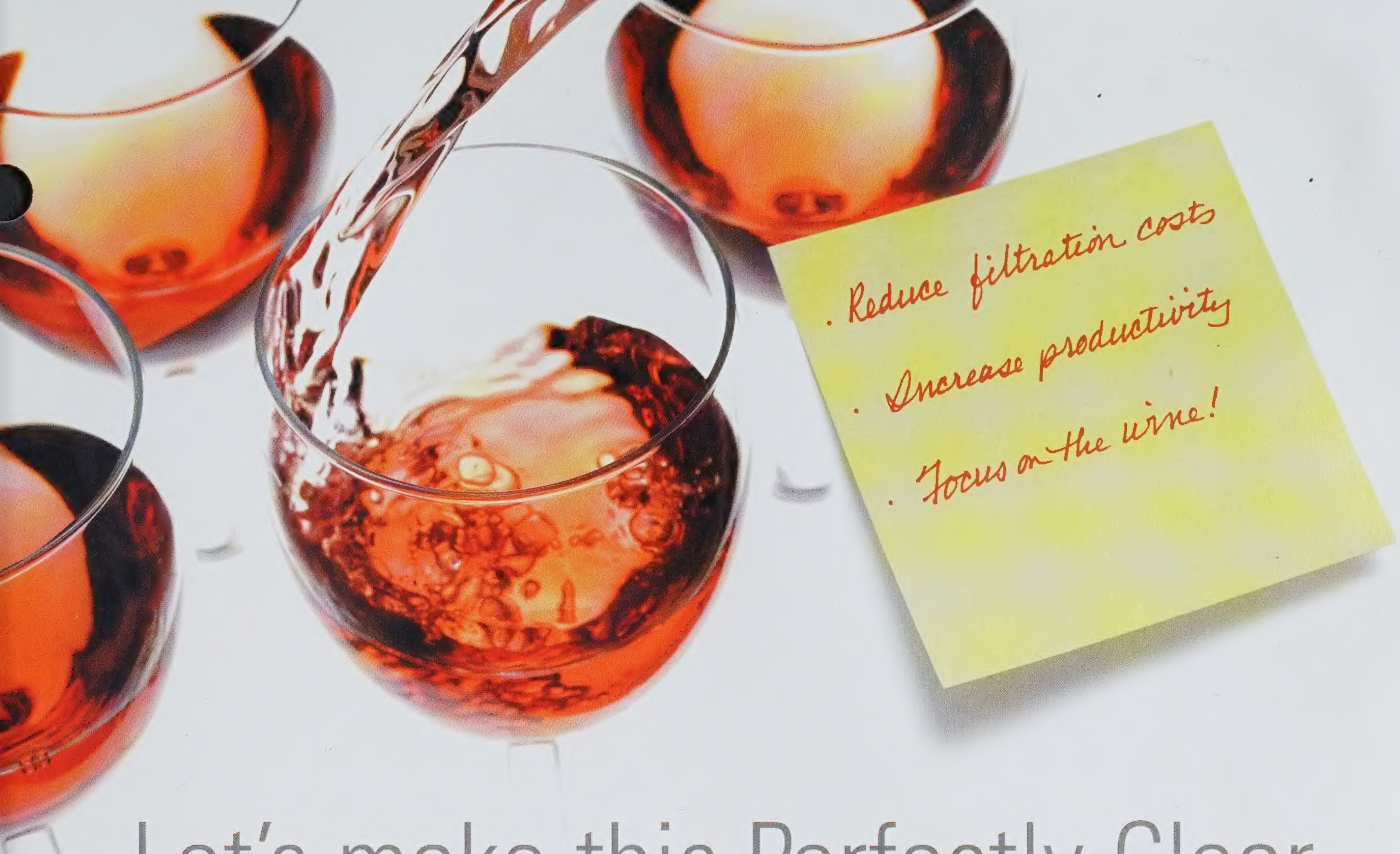
For those who would rather own then rent, cost of a new single-engine airplane, such as a Cessna Skyhawk four-seater, is about $200,000. Used airplanes start at about $22,000 — less than the cost of a well-equipped SUV.

Of importance to pilots — particularly business people who fly themselves on business — is the fact that they have access to 13,000 airports in the U.S., including some 6,000 public-use airports open for use anytime. That's in contrast to the 300 to 400 airports served by major airlines, and about 700 airports served by commuter and regional carriers. It is very likely there's a place to land within five to 20 miles of your ultimate business destination.

Personal flying can be very economical, especially for trips of up to 500 miles. Several company employees can travel for the price of one. You can carry cargo, such as samples, cases of wine, and equipment that is cumbersome or not allowed on common carriers.

The Franscioni brothers are among a growing number of vintners and winery operators who have incorporated flying into their business and lifestyle. In California, John Trefethen of Trefethen Vineyard (Napa) flies a twin-engine Aerostar to winemaker dinners and other industry events, and has used the vineyard's 2.5-mile long driveway as a runway. Jim Bundschu of Gundlach-Bundschu Winery (Sonoma), flies a Grumman Tiger, and grower Steve McIntyre of Monterey Pacific Vineyard Co. (King City), flies a Cessna 206 to business meetings throughout California.

For Franscioni, it's all about efficiency. "There aren't any aspects of this business that are not enhanced by my ability to fly — particularly the bottom line," he says. ■



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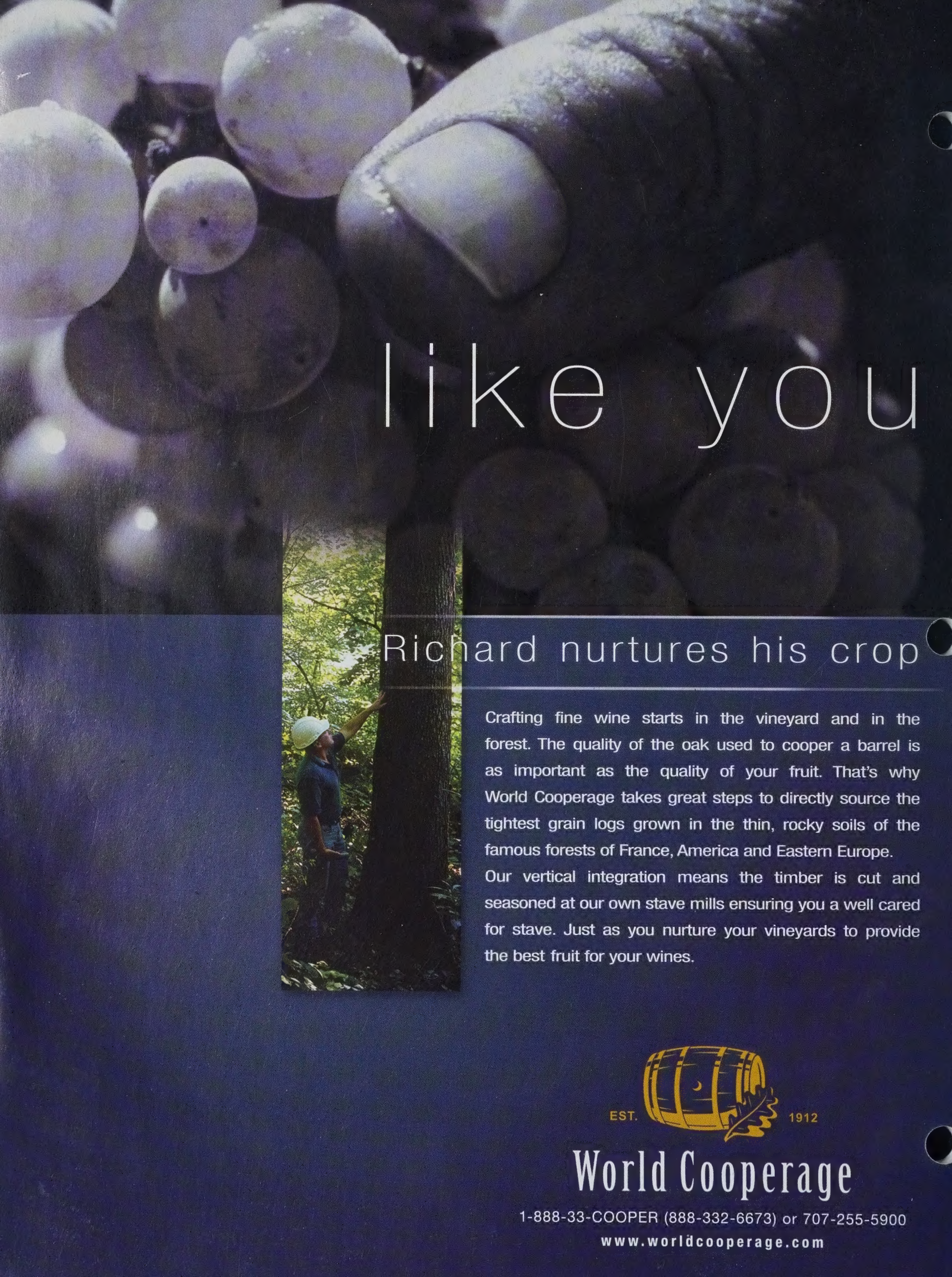

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